Ontario
Ministry of
Northern Development
and Mines
Sean Conway, Minister of Mines

ONTARIO'S MINES AND MINERALS

POLICY AND LEGISLATION:

A GREEN PAPER

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Ontario

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In the 1987 Throne Speech, the Government of Ontario made a commitment to initiate a comprehensive review of the current Ontario Mining Act. This Green Paper, prepared by the staff of the Ministry of Northern Development and Mines, is the first step towards formulating the substance of a new and improved Act, and sets out the policy directions and priorities the Government believes are appropriate and in tune with the long-term needs of the mining industry.

Mining is one of Ontario's most important economic sectors but it is subject to many external forces, including increased worldwide competition, international currency fluctuations, environmental and safety concerns, technological change, competing land use interests and native concerns. A new Mining Act is needed to ensure that Ontario continues to attract new investment in the mining sector, while continuing to preserve and uphold the broad public interest.

Based on this Green Paper, and the recommendations we receive from the public, a new Mining Act will be drafted and presented to the Ontario Legislature. Because of our desire and commitment to see legislation formulated in a timely manner, we have set March 31, 1989 as the deadline for submissions. The Ministry contact is:

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I strongly urge you to participate in this very important step in the process. Your views are essential to guiding mining activities in the province into the 21st century.

Sean Conway
Minister of Mines
December 12, 1988

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MINING AND MINERALS IN THE ECONOMY OF ONTARIO

Ontario and Canada are more dependent on mining to generate wealth, employment and export earnings than any other industrialized nation. Ontario is among the top 10 metallic mineral producers and exporters in the world. It is the world's third largest nickel producer, the fourth largest producer of both zinc and cobalt, the seventh largest producer of gold and silver and the eighth largest producer of copper.

The value of metallic mineral commodities produced in Ontario at the primary stage is about half that produced by all of the United States. Ontario accounts for almost 40 per cent of the value of metal production in Canada.

Mining, smelting and refining account directly for just over 10 per cent of Northern Ontario employment. Another 30 per cent of employment in Northern Ontario depends on mining.

Although mineral exploration covers a wider territory, mining itself is not land intensive. InOntario the area directly affected by mining is 200 square kilometers, about .02 per cent of Ontario's total area (see following Figure).

In terms of the productivity of labour in Ontario, the value added per employee per year in mining ($58,700) is almost twice the average for manufacturing in Ontario ($32,400), and approximately three times that of forestry ($20,200), and agriculture ($19,200).

The high value added in mining, compared to other industries, is reflected in the comparative wages of the mineral sector. In 1986, metal mining led other industry groups nation-wide, with average weekly earnings of $691, compared to the industrial aggregate, $431; forestry, $566; and all manufacturing, $504. During 1986, the mining industry spent in excess of $1.1 billion on supplies, fuel and electricity. To this economic impact must be added an approximately equal amount of local purchasing power generated by the wages and salaries paid to mineral sector employees.

Ontario's strong mining industry is the result of a proud mining legacy which predates Confederation. Its development and growth have been guided by the **Mining Act**, the province's senior mineral legislation. Further details on the history and development of mining in the province are presented in Appendix B.

THE IMPACT OF MINING ON THE ENVIRONMENT

The world's first mining textbook, *De Re Metallica*, written by Georgius Agricola in 1556, draws attention to the possible negative impact of mining on the environment: "... the strongest argument of the detractors is that the fields are devastated by mining operations ...". The interaction between mining and non-mining and the potential for problems probably dates back to the very origins of mineral resource extraction. One of the prominent issues in our society today is conflict over land use. The announcement of any major project - not just one involving mining - can create controversy. Cottagers see their peace and tranquillity threatened. Environmentalists fear for the removal of wilderness. Rural occupations such as trapping or wild rice harvesting may be perceived to be in jeopardy or a recreational area is seen to be at risk.

There is increased public awareness of new ventures undertaken by the public and private sectors. This has made the acquisition of the necessary approvals for any new project a very complex procedure. The mining sector is subject to this procedure, and it is an appropriate time to bring the disparate requirements of the mining industry, government regulation and the public into a more organized process. We now have an opportunity to resolve or mitigate these differences by providing a process for communication, consultation and reconciliation.

A NEW APPROACH

Any new approach must be viewed in the light of the unintentional legacies of the past. The long history of mining in Ontario has left behind scars ranging from unsightliness to "abandoned mine hazards". These include sites with no landscaping, revegetation or other visual reclamation; old mill buildings in danger of falling down; unconfined sulphide tailings that may contaminate waterways with silt and acid; and exca-

vations which may cave in unexpectedly. Roads and parking lots have been built over old workings that have collapsed. Hazards also exist after surface explorations; dangers could arise from trenches left in dangerous condition or from uncapped exploration pits and shafts. This legacy of potential hazards must be addressed and eliminated.

This Green Paper proposes measures that will help Ontario maintain and enhance its ability to attract mining capital for the development of mineral projects while, at the same time, accommodating the legitimate concerns and interests of other sectors of the community.

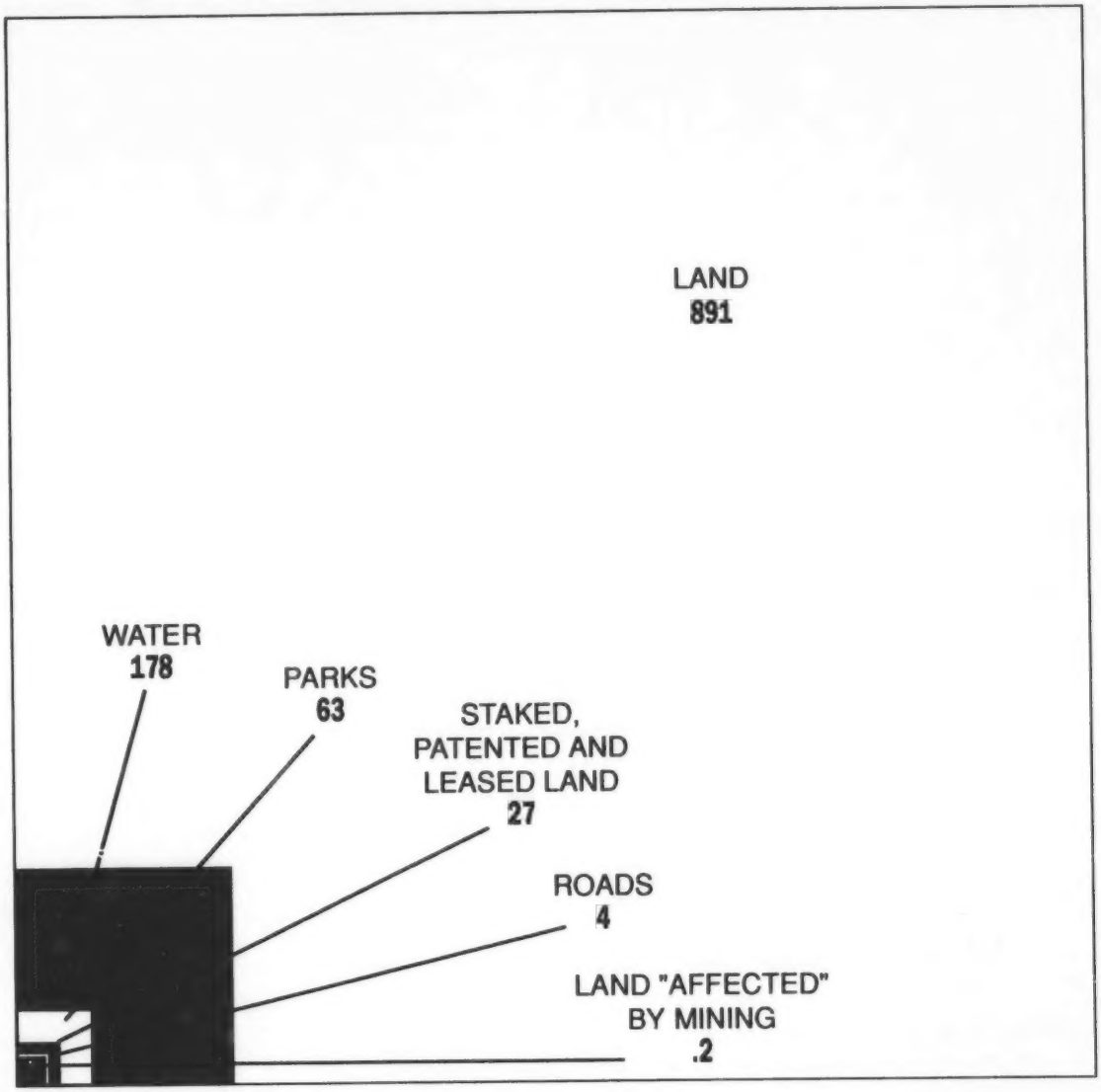
Chapter I discusses the provisions of the existing **Mining Act** concerning the acquisition and retention of title and recommends improvements to encourage investment in mineral exploration and development in Ontario. New provisions are recommended dealing with prospector licensing, staking practices, improved security of tenure and assessment work requirements.

Chapter II proposes a new procedure whereby the Minister of Mines will issue a Mining Permit once the concerns of all other Ministries and Agencies have been satisfied and adequate public consultation has taken place. It also recommends that provision should be made for safe mine closure and abandonment before a mine goes into production, and requires financial assurances to ensure reclamation plans are carried out.

Chapter III addresses industrial minerals, domestic processing, the use of regulations, and freedom of information vs. confidentiality.

AREA "AFFECTED" BY MINING

(Figures in thousands of square kilometers)



The above diagram is a graphic illustration of the relative size of land areas in Ontario set aside, or currently being used, for mining and mineral exploration, parks and roads.

Of Ontario's total area of 1,069,000 square kilometres, 83.3% is land mass. The relative percentages of land area designated for selected uses are as follows:

Parks	7%
Staked, patented and leased land	3%
Roads	0.45%
Land "affected" by mining	0.02%

Source: Ontario Ministry of Northern Development and Mines 1988

CHAPTER I

ACQUISITION AND RETENTION OF TITLE TO MINERAL RESOURCES

This chapter looks at the means whereby: (a) the process of mine finding may be facilitated by a modern regulatory framework and (b) explorationists may be encouraged to enhance the geoscientific data base in the public domain.

1.1 PROSPECTOR LICENSING

The Ontario Government conveys the privileges and rights contained in the **Mining Act** (e.g. to prospect or to stake out, record or acquire unpatented mining claims) only to those individuals and companies holding a prospector's licence. The table below presents a profile of licence holders.

A prospector's licence is required in order to:

- Prospect on Crown lands.
- Stake Crown lands.
- Acquire by transfer and hold unpatented mining claims.
- Have access to patented surface rights where the mineral rights are open to prospecting and staking.

Sections 18 to 27 inclusive of the **Mining Act** govern the licensing of prospectors while most of the rights conveyed by the licence are defined in Sections 60 to 66 of the Act. Section 92 sets out conditions for compensation for all injury or damage from staking and or prospecting and development. The penalties for offences are set out under Section 172 of the Act.

The **Mining Act** imposes the following conditions on individual prospectors' licences:

- The applicant must be over 18 years of age.
- The licence is not transferable.
- Tags to stake claims are issued only to licensees and are not transferable and may only be used for the fiscal year in which they are issued.
- A licence remains active only until March 31 of the year following the date of issue (i.e. they expire on April 1 of every year unless renewed). If the licence expires, any claims held under that licence also expire.
- The licence becomes permanent if the individual has been licensed for a continuous period of 25 years.

Company licences are issued only to companies and only to those companies eligible to hold unpatented mining claims in Ontario (as specified under Sections 18 and 19 of the **Mining Act**). The licence fee is dependent on the company's authorized capital or the number of shares of no par value. The fee can be $25.00, $50.00 or $100.00. A company licence cannot be used to stake claims but it is required for the company to hold claims.

PROVINCE OF RESIDENCE OR REGISTRY OF HOLDERS OF ONTARIO PROSPECTOR LICENCES

RESIDENCE	INDIVIDUAL	COMPANY
Ontario	3462*	656**
Alberta	21	39
British Columbia	77	168
Manitoba	62	4
Nova Scotia	2	1
Quebec	151	25
Saskatchewan	10	2
New Brunswick	2	–
Yukon	2	–
Outside Canada	87	17
	3876***	912

(*) of which 2278 are in Northern Ontario
(**) 451 Toronto-based
(***) Includes 652 Permanent Prospector Licences

Source: Ontario Ministry of Northern Development and Mines 1988

In terms of the Ministry of Northern Development and Mines' internal administrative practices, the licences are an official recognition of prospecting as an occupation and are used to maintain a list of prospectors' addresses. Those addresses are often used for purposes of serving notice on licensees. The Ministry does not generally monitor the activities of licensees except on a reactive basis when complaints are brought. The principle in the industry is one of self-regulation.

In general, control over licensees has been maintained through licence suspension or revocation. Suspension is for a limited time period, and it prevents the licensee from either staking or acquiring mining claims but licensees may continue to work and lease their existing properties. Revocation does not allow the licensee to hold mining claims, and it is in effect until the Minister sees fit to reinstate the licence.

ISSUES

The current system of prospector licensing has the following problems and shortcomings:

- There are no qualifications required to obtain a prospector's licence other than that the applicant must be over 18 years of age.
- Controls on what prospectors may do to explore are perceived to be inadequate.
- There is no requirement that the prospector know how to stake a claim properly.
- There is no requirement for prospectors to have knowledge of survival skills.
- The yearly expiration of licences causes the system to enforce forfeiture of claims. Prospectors lose any investment that has been made in those claims.

RECOMMENDATIONS

The Province should have a prospector licensing system that educates licensees about the requirements of mineral related legislation and ensures that prospectors respect the rights of other resource users and surface rights holders and are aware of the need to preserve the environment.

The right to access and prospect on Crown lands and the right to access and prospect on those patented surface rights which are open to staking should remain. This principle is fundamental to new mineral development in Ontario.

Mineral rights acquisition should remain open to the largest section of the public possible and should be made as simply as possible in order to promote activities that will increase the probability of finding more mines.

The recommendations are:

Require all applicants to provide suitable identification before obtaining a licence.

Require all licence applicants to pass a simple test on prospecting, staking, surface rights holder's compensation, survival skills etc., before obtaining a licence.

Maintain the rights which currently accompany the licence, i.e. the right of access to Crown lands, the right to stake claims and the right to perform exploration work.

Introduce a licence renewal system tied to the licence holder's birthday and require the holder to notify the Ministry of Northern Development and Mines of any change in address.

Allow claim tags to remain valid as long as the licence is maintained in good standing (i.e. they should not expire on March 31 if the licence is properly renewed).

Permit licence holders to stake as an agent for another individual or corporate licence holder.

1.2 ACQUISITION OF MINING LANDS AND TITLE

"Acquisition of mining lands" is the term used to describe not only the activity of acquiring lands but the right to explore and, ultimately, extract minerals from those lands. This process can involve the negotiation of agreements with existing private owners, the outright purchase of lands, the staking of lands, or acquisition from the Crown of these rights under a licence of occupation or other form of permit. The Crown uses the term "disposition" to describe the activity of granting such rights.

Differing views of what constitutes effective stewardship of public lands has led to different approaches. The following summarizes four different approaches to land disposition.

Disposition to the highest bidder.

This approach maximizes the dollar return to the Crown. It is an approach used in the disposition of oil and gas exploration permits (leases) by the federal government of Canada and the government of the United States. The industry must assess the potential of the lands and what it can afford to pay to acquire them; the government gains maximum revenue at the front end of the process, with a chance of taxation revenue should production occur.

Disposition to the party that bids the most exploration dollars.

The best return to the public will be realized through the discovery and development of a mineral deposit, and there will be a greater chance of discovery if funds are spent on exploration. This approach has the added benefit of maximizing new geological information. It has been used in Ontario in the past when the province has been disposing of large tracts of land in remote areas that are of interest to more than one party.

Disposition through claim staking.

This approach, which is now used in Ontario, puts all competitors on a relatively equal footing and the applicant need not meet any financial criteria. This is a "self-serve" system that, other than differing costs of access, places the same acquisition price per acre on all Crown lands. The government's role in this process is as a rule-maker, enforcer and referee between disputing parties. The approach opens the door to participation by the individual prospector. In Ontario, claims can only be held for a certain time without being worked. By not making it too simple or cheap to hold large areas for long periods of time, the turnover of lands is encouraged and the land is made accessible to those with new exploration ideas and financial resources.

The "first-come, first-served" approach.

This approach is fairly common in the oil and gas industry. Disposition is made for a low but fixed price per acre, to applicants in the order they apply. The method is most appropriate in areas where the potential is unknown and the interest of the industry has not been too high. In such cases, the Crown is trying to minimize the cost of acquisition in order to encourage investment.

The prime motivation for industry to explore a particular area relates more to the mineral potential than to any set of laws governing land acquisition. In other words, it would not be possible for a government to overcome a lack of mineral potential and generate revenue and/or development in an area simply by offering lands at a low price. However, it is equally true that onerous requirements or too high a price for land acquisition can have a discouraging effect on investment even in areas of high mineral potential.

Ontario's traditional approach to the disposition of lands for mineral (as contrasted with oil and gas) exploration, has been to make laws that allow maximum participation by the individual prospector. For the most part, this has meant that the favoured method of land disposition has been claim staking. This approach has contributed to the development of a large number of producing mineral deposits that were originally discovered through the efforts of a single prospector rather than a large company.

The ensuing sections concentrate on modernizing the existing method of claim staking, while retaining the best elements of what has proven to be a successful method of facilitating the discovery of mines.

In Ontario, the **Mining Act** provides authority and direction for two distinctly different methods of acquiring mineral rights. The first method is claim staking. The second method using a type of "first-come, first-served" approach is through application to the government for a discretionary grant called a licence of occupation.

STAKING PRACTICES

ISSUES

Inflexible Staking Requirements

Sections 40 to 50 inclusive of the **Mining Act** describe the traditional method of staking out mining claims whereby a licensee, without requiring any sort of special consent from a government official, may stake out a 40-acre parcel of land which is open for staking. Such staking, if properly done and filed with a Mining Recorder, entitles the staker to explore the mineral potential of the land and to obtain a lease that will authorize the removal (production) of minerals. Section 112, provides a non-discretionary method of acquiring exploration rights for petroleum and natural gas in Northern Ontario only, by staking out a boring permit. However, this section has not been used in recent years.

With the traditional method of staking, the staker has a statutory obligation to blaze the trees plainly and cut the underbrush, plant pickets, or erect monuments along the claim boundary lines. Posts must be planted at each of the four corners of the claim and witness posts may be used to indicate a corner where the nature of the ground renders it impractical to plant a post. These requirements are reasonable for the majority of staking that occurs but can cause problems in areas that are environmentally sensitive or where improvements have been made to the surface by the owners (e.g. tree plantations, farm lands, recreational lands, urban subdivisions). The blazing of trees, or planting of pickets or posts is not always acceptable to the surface owner as it can be unsightly and may cause property damage as well as create the impression of trespass. For instance, posts and blazed lines visible from the waters of a recreational lake may spoil the natural beauty.

The **Mining Act** provides no alternative method of marking out the boundaries and corners which would avoid or minimize these problems. There is no opportunity for the staker to exercise reasonable judgment in the field by, for example, witnessing a claim corner that happens to fall in the middle of a farm field or residential lot. The Minister must consent to the staking of a townsite but once consent is given, the staker is obliged to carry out the staking in the prescribed fashion in spite of improvements that may exist in the townsite. A gap left in a claim line in order to avoid an environmentally sensitive area or a surface owner's improvement is considered a technical defect in the staking.

Large bodies of water do not readily lend themselves to tradi-

tional staking methods. Changes in legislation to allow common witness posts and even perimeter staking will not overcome the impracticality of planting posts, for example, on the shore of a lake to indicate staking that could be some miles out in the water. Such posts might be planted on either side of the lake and would not easily be found without a copy of the staker's sketch in hand and therefore would do little to delineate the claim in the field and provide evidence to others of the staking. While the Act allows the use of a single post, under certain circumstances, to indicate a corner common to more than one claim, it does not allow the use of a single post to witness a common claim corner in the water.

Dangerous conditions can result from the current provision that priority of recording a new application prevails in the event that two stakers commence staking the same ground at the same time. The danger lies in a race from the field to the Mining Recorder's office (which could involve the use of aircraft and ground vehicles). The danger may be not only to the licensees but to the general public as well.

Limitation of Claim Size to 40 Acres

The 40-acre size of a mining claim was decided at the beginning of the century (when it was also a requirement of the Mining Act that there be an actual discovery of valuable mineral in place before a claim could be legally staked). The discoverer was limited in the number of claims that could be staked in a year. The discoverer also had to perform considerable manual work on the ground in order not to lose the claim. The exploration methods of the day were limited to the basics of uncovering and examining the rock by hand.

Elimination of both the requirement of discovery and the limit on the number of claims that could be staked in a year, together with advances in exploration technology, have created a situation where explorationists tend to have regional exploration programs. These require the acquisition of large land positions before the explorationists venture onto the ground to explore. In fact, it is becoming increasingly difficult to raise funds for the exploration of small groups of claims.

The provisions of the Mining Act have not kept pace with these changes in mineral exploration. The acquisition of large tracts of land involves the staking of many individual claims. The majority of these large-scale staking projects are done by staking contractors who employ licensees to stake claims. For the sake of a competitive price and efficiency of operation, prescribed staking methods are often ignored in favour of grid or block staking.

Security of Title

According to Section 84 of the Mining Act, non-compliance with any requirements of the Act as to time or manner of staking is deemed an abandonment and the ground is open for staking. But Section 50 provides that substantial compliance with the requirements of the Act is sufficient. To complicate it further, Section 56 provides that a dispute may be filed by a another licensee who alleges that a claim is invalid. Such rules place a considerable burden on the Mining Recorder's judgment.

A purchaser of a claim or group of claims is not likely to know the manner in which the claims were staked and runs the risk of assuming potential title to claims which may not have been staked in the proper manner (i.e. grid staked) or do not substantially comply with the staking requirements. Inspection of the ground prior to purchase is a protective measure that could mitigate some of the risk. An inspection, however, might do nothing to alert a purchaser to problems of improper staking.

Section 57 provides for a certificate of record which, if obtained, protects the claim from dispute in the absence of mistake or fraud. The procedure involved in applying for and issuing a certificate of record requires field inspections and, therefore, is time consuming. In the heat of a staking rush, delays in establishing title to mining claims may be unacceptable to the licensee. Concern has also been expressed over the power of the Mining and Lands Commissioner to revoke a certificate. In an effort to assure title to claims, it has been the practice to restake them completely and file "friendly" disputes. In such cases, if the original staking is cancelled and the restaking recorded, assessment work applied to the original claims may not be applied to the restaked claims and legal agreements between interested parties may be breached and require rewriting, all at considerable expense.

A requirement under Section 57 for a certificate of record is that surface rights compensation under Section 92 must be paid. As compensation must also include payment for any possible future damage, the requirement becomes an unreasonable impediment to obtaining the assurance a certificate provides.

RECOMMENDATIONS

Modified or alternate staking methods

New legislation should provide more flexibility in the manner that a claim boundary is marked out or in the placing of a claim post. Bearing in mind that part of the objective of staking is to establish visible evidence of a prior right to the lands, the following measures should be introduced. Provision should be made that allows and obliges the staker in the field to act responsibly when encountering a situation that could be sensitive.

The recommendations are:

Require that witness posts be used to indicate the start and end points of gaps left in a claim boundary line where the planting of pickets or the blazing of trees would be detrimental to the interests of a surface rights owner.

Require fluorescent flagging tape to be used to indicate that portion of a claim boundary line that traverses a private tree plantation or recreation area.

Require witness posts to be used to indicate the true location of a claim corner where the planting of a post at the actual claim corner would be detrimental to the interests of a surface rights owner.

Designate areas that are environmentally sensitive and identify them on the mining claim control map as being subject to modified staking and exploration requirements.

Allow for the use of common witness posts.

Amend the staking process to require that the time staking is completed be inscribed on the number one post. The recording process would also be changed so that the first application received in the office would be recorded unless, within 24 hours, another party presents an application indicating an earlier time of completion.

Map Staking

The concept of map staking is controversial. The fear is that eliminating the requirement of physically establishing a claim in the field would make it too easy to buy a large land position and eliminate competition. The staking method of acquiring land is deemed more fair to individual prospectors and small companies who can acquire a few key claims competitively in this manner, in contrast to large corporations which can afford to map stake and hold large blocks of claims. Map staking is also opposed by its detractors on the grounds that it does not provide visible evidence that the ground has been staked or of the limits of the staking.

There are circumstances, however, where staking is impractical or undesirable (e.g. large lakes, the James Bay Lowlands, surveyed townships, townsites, cottage properties and large farming areas.)

Recommendations

Designate specific lands where predetermined grid areas could be acquired by map staking through application at the mining recorder's office.

Charge higher application fees for map staking than those for claims staked on the ground.

Perimeter Staking

The concept of perimeter staking has been promoted by most who have made submissions on changes to the Act. It is seen as a method of acquiring lands more cheaply and conveniently, and one that also recognizes the modern tendency towards large land holdings. It is also seen as a method of overcoming some of the problems associated with grid staking. Compliance with perimeter staking requirements would involve about 75 per cent fewer posts and lines and should therefore involve less risk of errors. However, as the distance between claim lines could be much greater, it will mean that it will be more difficult to determine what lands have been staked.

Recommendations

Permit perimeter staking, subject to regulations defining:

- **a method and standards for staking a perimeter claim, including the acceptable maximum size of a single claim, the need for line posts at set intervals along the perimeter, inscription requirements, etc.;**
- **a mechanism for setting priorities among competitive stakers of perimeter claims;**
- **mechanisms to allow the voluntary reduction in size of a perimeter claim and to allow a group of commonly held individual claims to be consolidated into a perimeter claim in order to eliminate concerns about interior lines and posts;**
- **staking standards that would place more responsibility on the staker to mark out the claim boundaries properly in the field;**
- **recording standards that would place more responsibility on the staker to illustrate accurately the area staked on the application;**
- **the allowable use of assistants by the licensee staking the claim.**

The introduction of perimeter staking and better guidelines on the use of assistants may reduce the number of problems with grid and proxy staking. The reasoning is that many of the current rules are being broken not in any effort to maliciously defraud anyone but due to their impracticality or lack of efficiency. These new provisions, however, would do little to remedy problems associated with poor quality staking or with those individuals who seek to take advantage of the system at someone else's expense.

Security of Tenure

Poor quality staking is something that can often be seen on a visit to the ground by a potential purchaser. The fact that few choose to exercise their right to examine claims prior to paying for them is a matter that is difficult to deal with.

Recommendations

Introduce a provision that a claim is not disputable after it has been in good standing for a

year and apply this provision to all claims staked under the current Act.

During the first year: raise the fee for filing a dispute, require a detailed statement of claim to accompany any dispute, and consider the right of the purchaser to re-stake claims.

Existing standards for staking (size of claim, post size, extent of blazing, method of marking out lines) could also be modified in an effort to ensure that they remain reasonable. However, minimum measurable standards must be maintained.

DISCRETIONARY GRANTS OF MINERAL TENURE

Sections 38 and 190(2) of the **Mining Act** provide that, subject to the approval of the Lieutenant Governor in Council, a discretionary grant of mining lands or mineral rights may be given on such terms as are deemed expedient. In the past, these provisions have been used to issue exploratory licences of occupation (ELOs) for large tracts of land in remote locations that, because of the lack of trees and due to the extensive areas involved, do not lend themselves to traditional staking. For example, ELOs were issued for large areas in the James Bay Lowlands for industrial mineral exploration. Often included in these ELOs were conditions for annual increases in exploration expenditures, performance bonding, environmental protection, leasing and production.

Section 200 sets out predetermined conditions for issuing ELOs under specific circumstances. This Section has not been used in recent years because it contains no provision for environmental protection bonds and has no flexibility in annual expenditure requirements.

Revised Regulation 604/70 is a regulation administered by the Ministry of Natural Resources under the **Mining Act** for issuing exploratory licences and leases for oil and natural gas in certain lands in Northern Ontario. Although grants under this Regulation are discretionary, an Order-in-Council is not required. The Regulation lays out a grid over these lands and provides that licences for these grid areas may be obtained by application to the Minister of Natural Resources. As with Section 200, there is little flexibility in terms and conditions. Few licences have been issued under this Regulation.

The qualification criteria and working conditions of these discretionary grants are not clearly defined or updated with the changing goals and objectives of the government. In the past, ELOs were offered by calling for tenders as a method of disposing of exploration rights in the James Bay Lowlands at a time when industry interest in the potential for industrial minerals and fossil fuels in that location was high. The terms and conditions of each ELO varied with the terms of the offer that was accepted. Unlike the terms in the **Mining Act** for maintaining staked claims, terms for ELOs were being continually negotiated and changed. This created a considerable administrative burden as well as a distrust of the system by those who were unsuccessful with their tenders.

Discretionary grants are actually perceived as a form of map staking. The problem with ELOs, as with map staking, is that it allows an individual or company to gain control of a large area of ground simply by making application to the government. If significant mineral deposits are discovered, discretionary grants effectively eliminate competition and force outside parties to deal with a "land baron."

ELOs issued in the past have required less exploration expenditures than would be required to maintain an equivalent area of staked claims. This and the fact that the lands were acquired without the expense of staking has led to a poor reputation for this form of disposition and an unofficial policy that ELOs would not be issued in easily accessible areas where staking has taken place in the past but would be restricted primarily to the Lowlands.

The flexibility of a discretionary grant is of benefit when tailoring terms and conditions to an individual applicant who is not in competition with other applicants. It also makes it easier to accommodate site-specific concerns of either the applicant, the public or the government.

A very flexible form of authority currently exists for issuing exploratory licences of occupation. This form of authority should not be changed but might be augmented with the inclusion of the concept of map staking in certain remote (designated) areas. As ELOs are a form of map staking, there may be a compelling argument that it would be better, under certain circumstances, to designate areas as subject to map staking. The advantage of map staking over ELOs would be higher fees, rigid work requirements and the fact that this non-discretionary acquisition process may involve less administration.

Section 200 and R.R. 604/70 or any equivalent should not be retained in any new legislation.

RECOMMENDATIONS

Limit the use of discretionary grants as a means of disposing of exploration rights.

Develop clear guidelines and qualification criteria to define those exceptional circumstances where a discretionary grant is appropriate.

ASSESSMENT WORK

After a licensee has properly staked and recorded a mining claim, the **Mining Act** requires that the recorded holder undertake exploration work or "assessment work" on the claim. The recorded holder uses the work to obtain credits to maintain the claims in good standing and to bring them to lease.

All assessment work must be documented and submitted to the Crown for evaluation, approval and awarding of credits. Section 77 of the **Mining Act** clearly defines the types of exploration work that can be submitted for assessment credits. Depending on the type of work, documentation may consist of sketches, drill logs, core specimens, receipts, technical reports and maps.

Once approved, the assessment work is available for public examination at the Ontario Geological Survey, Toronto, the Resident Geologists' offices, the Mining Recorders' offices and the Drill Core Libraries. This data is used extensively by the Crown and the public.

Types of Assessment Work

In Ontario, the assessment work carried out by the recorded holder is measured in "man-days of assessment work." Most jurisdictions with a similar system measure assessment work in monetary terms. Ontario's system places the emphasis on time more than dollars. Historically, this approach was intended to give a prospector, who has limited funds but ample time, the opportunity to bring a claim to lease. The following examples show the emphasis on time versus dollars spent on the claims. They also illustrate the three criteria used in awarding credits; time spent, number of feet drilled and dollars spent.

Types of Assessment Work	*Credits*
1) Manual work (e.g. pick and shovel)	1 man-day for each 6 hours a person is employed
2) Mechanical equipment (e.g. using a plugger)	1 man-day for each 3 hours a person is employed
3) Geological, geochemical and geophysical surveys	7 man-days for each 8 hours a person is employed
4) Shaft sinking or lateral work	4 man-days for each 3 hours a person is employed

It should be noted that the money spent in carrying out these activities, whether it is $50.00 or $500.00, is not taken into consideration. The cost of doing the same activity may vary greatly depending on location.

Other types of assessment work are not easy to credit in terms of man-days. In the case of drilling and boring, credits are not awarded on time spent, but on feet drilled:

Types of Assessment Work	*Credits*
1) Diamond drilling	1 man-day for each 4 feet drilled and 1 man-day for each foot drilled below 100 feet
2) Boring	1 man-day for each 2 feet drilled

Finally, there is a third type of assessment work which is capital rather than labour intensive. Assessment credits are awarded, based on dollars spent:

Types of Assessment Work	*Credits*
1) Stripping by mechanical equipment (e.g. bulldozer)	1 man-day for each $10.00 spent
2) Beneficiation studies, assays, microscopic studies, consultants' reports, etc.	1 man-day for each $15.00 spent

There are guidelines and standards for submitting assessment work. If a holder fails to meet these standards, the Crown may award fewer work credits.

In the past, minor amendments have been made to the **Mining Act** to permit the use of costly new exploration techniques, but these changes have retained the "man-day" measure of assessment work.

Sections 76 to 82 inclusive of the **Mining Act** deal with assessment work and impose the following conditions:

- A total of 200 days of assessment work must be done and recorded within five years of the date of recording the claim, at the rate of 20-40-40-40-60 days per year.
- If the recorded holder does not perform and report the required amount of assessment work within the prescribed time, the Crown can cancel the mining claim and the lands are automatically open for restaking.
- When the required amount of assessment work per claim is complete, the recorded holder may apply for a 21-year lease of the claim. The lease may be for both surface and mineral rights (if the surface rights are available) or for mineral rights only. The choice is entirely up to the claim holder.

The main objectives of assessment work are:

- to provide the Crown with documented evidence that the recorded holder did spend time and money on the claim, thus demonstrating interest in bringing the claim to lease and ultimately developing a mine;
- to enhance the geoscience data base of the province by making assessment work available to government geoscientists and the public, thus helping to stimulate further exploration and development of Ontario's mineral resources.

ISSUES

Problems with the present assessment work system expressed by prospectors and exploration companies include:

- The "man-day" of assessment work system does not adequately compensate the recorded holder when costly new techniques are used to explore a claim.
- Assessment credits are not awarded for the cost associated with mobilizing and demobilizing exploration and prospecting programs.
- Assessment credits are not awarded for the cost of any exploration before staking a claim.
- When claims are smaller than the prescribed 40 acres, the holder still has to perform 200 days of assessment work to bring the claim to lease.
- Certain requirements of the Act are unsuitable for a specific exploration program and may force the holder to do unnecessary assessment work. This work may not contribute to the geological database.
- The present system does not allow geotechnical work to be transferred to contiguous claims. As a result, the holder may be forced to spend valuable exploration time and money on ground of no economic value in order to retain the integrity of a claim block.
- For certain commodities (e.g. building stone) the present assessment work requirements are excessive relative to what may actually be required to explore the property.
- When a geological, geophysical or geochemical survey does not cover an entire block of intended claims due to physical barriers (e.g. lakes, swamps, ice break-up etc.) then all of the claims in the block that would have received full credit will lose some of the earned credits as a penalty (Section 77 (15)). This reduction of credits may cause some or all of the claims within the block to be forfeited.
- The Act currently limits the number of credits per type of work that can be awarded to a claim:

Type of Work	*Max. Credits per Claim*
Geophysical surveys (ground and airborne)	8 days
Geochemical surveys	40 days
Geological surveys	40 days
Beneficiation studies, etc.	60 days
Stripping	100 days

- The system does not encourage holders to submit work in excess of requirements.

All of the above are serious problems for the prospector and exploration company; some also create major administrative problems for the Crown.

An effective assessment work system should:

- be simple to interpret and easy to administer;
- stimulate the exploration and development of Crown lands;
- encourage the active exploration of claims;
- encourage claim holders to submit high quality data to the Crown on the work conducted and mineralization discovered;
- encourage claim holders to submit as much data as possible, over and above the minimum required to maintain the claim in good standing;
- encourage active exploration to continue after the stage at which a lease is currently issued.

OPTIONS

Three basic options for ensuring an effective assessment work system are as follows:

- Retain the "man-day" assessment work system.
- Replace the current "man-day" assessment work system with a dollar-value assessment work system.
- Permit payment of money in lieu of assessment work under certain circumstances.

RECOMMENDATIONS

Retain a system of encouraging submission of assessment work.

Change the present "man-days" assessment work system to a "dollar-value" system.

Set the value of required exploration work at a relatively high level initially in order to force either development or abandonment of the claim.

Develop a system of "banking" assessment credits whereby excess work performed in one year may be "banked" and then withdrawn, as required, in future years to partially fulfil the requirement to keep these or other claims in good standing.

RETAINING TITLE

Ontario is currently experiencing a high degree of staking activity. In 1987, there were more than 150,000 claims in good standing, about four times the number in 1978. In any given year, about one per cent of the claims in good standing go to lease (see following Figure and Table). Recent estimates indicate that it takes approximately $2,000 in assessment work and another $1,500 to $5,000 in survey costs to bring a single claim to lease. This expense is considered high enough to discourage mining and land speculators from bringing claims to lease for speculative purposes.

The complex range of land tenure options under the present **Mining Act** (1980) can be outlined as follows:

Leases and Licences.

On completion of the required assessment work the holder of a mining claim may obtain a 21-year lease of the mining rights only, and has the option of obtaining the surface rights if the surface rights are available (Section 94). Since 1978, approximately 6,400 mining claims have been leased under this Section. These claims represent about 103,600 hectares.

If the recorded holder has complied with the requirements of the Act, the holder is entitled to a lease. However, renewals of 21-year leases are at the discretion of the Crown (Section 94(7)). A policy statement issued by the Crown in 1985 and again in 1986, informed all lessees that those leases which expire before January 1st 1990 would be renewed upon application. Leases that expire after that date would be renewed only if one of the following five conditions were met:

- The lease is part of a larger contiguous land holding which has been or is currently being explored or developed.
- Exploration or development work has been or is currently being performed on the lease.
- A mineral deposit has been located which has the potential of being worked under favourable economic conditions.
- Actual production (mining) or underground development work has taken place during the term of the lease.
- Lessee will demonstrate a commitment to perform future exploration and development work (e.g. work contracts, option agreements, etc.).

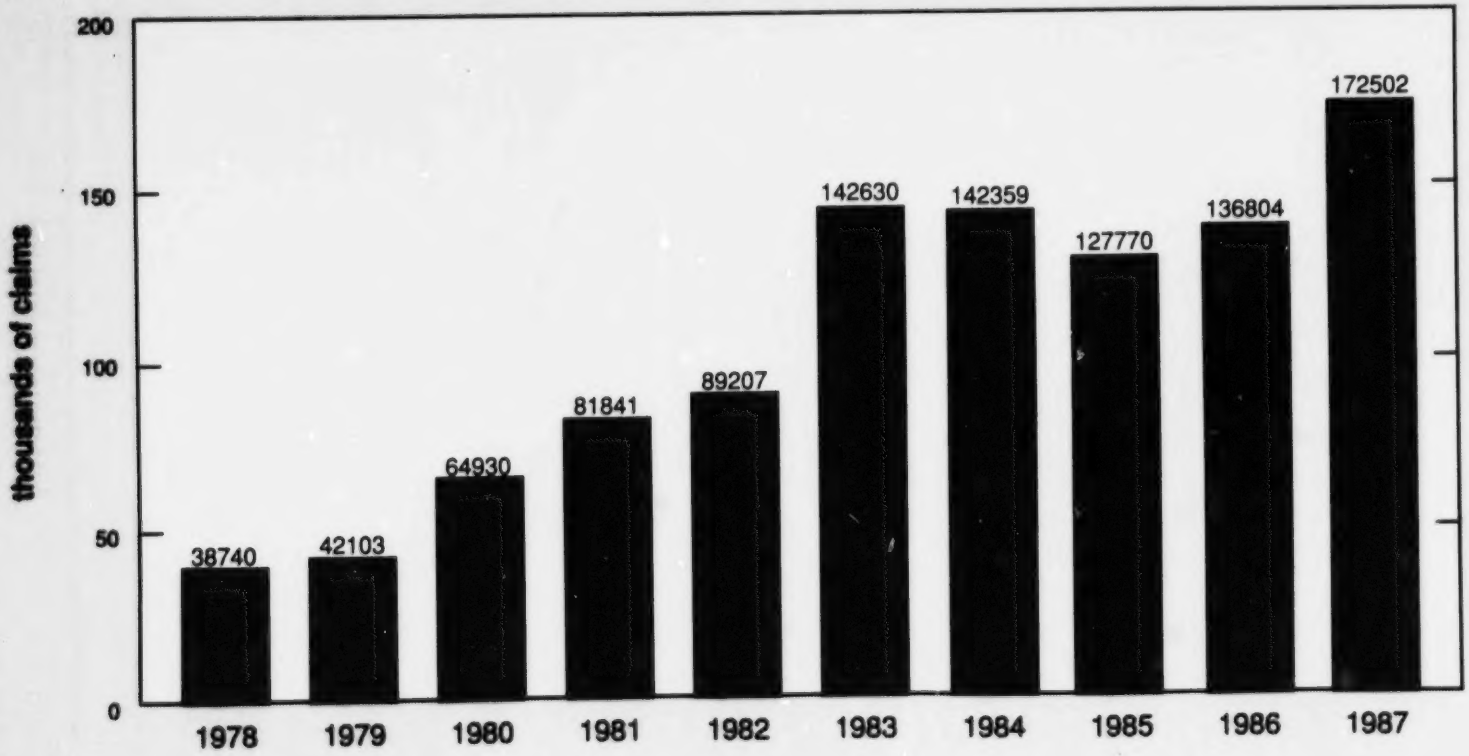
The purpose of this policy was to ensure that leased mining lands are explored or developed. If not, then the lands would revert to the Crown and be reopened for staking and new exploration/development, thus recycling the limited amount of mining land within the province.

A lessee, patentee or licensee may obtain a 21-year surface rights lease to lands adjacent to a lease, patent or mining licence of occupation. The surface rights lease is issued for the purpose of tailings and waste disposals or for constructing a shaft or buildings for mining or mining purposes or for any other purpose essential to mining (Section 97). No assessment work is required to obtain this type of lease. The annual rental for a surface rights lease is $1.00 an acre and the same rate applies upon renewal. Surface rights leases are issued at the discretion of the Crown.

The **Mining Act** provides a number of other avenues for obtaining title to Crown land for mining purposes, specifically, Sections 96(3), 114, 115, 116, 117, 190(2), 200 and Part VII.

A number of leases and mining licences of occupation currently in existence, were issued under earlier legislation. No more

MINING LANDS IN ONTARIO
MINING CLAIMS IN GOOD STANDING



Unpatented mining claims only.

Source: Ontario Ministry of Northern Development and Mines 1988

MINING LANDS IN ONTARIO

(as at June 15, 1988)

TYPE	NUMBER	HECTARES
Patented Mining Lands	–	450,549
Exploratory Licences Gas and Oil*	175	235,098
Gas Production Leases*	293	349,664
Exploratory Licences of Occupation	11	131,265
Mining Licences of Occupation	1,418	43,911
Mining Leases	4,885	258,003
TOTAL		1,468,490

*Administered by the Ministry of Natural Resources

Source: Ontario Ministry of Northern Development and Mines 1988

licences and leases of this nature are issued but the existing titles continue. For example, perpetual 10-year leases for both mining and surface rights or mining rights only, were issued when the mining claim was situated in a provincial forest, or when the claim holder elected to take a 10-year perpetual lease in lieu of a patent. (Prior to 1965 one could take a mining claim to fee simple patent without first going to a lease and production. However, this is no longer possible.)

Mining licences of occupation were issued for mineral rights under bodies of water adjacent to mining patents or 10-year mining leases. These licences were issued in perpetuity with a fixed rental. Other statutes that granted or grant title to mining rights were:

- **The Free Grants and Homesteads Act**
- **The Canada Company Lands Act**
- **The Public Lands Act**

Fee Simple Patent.

When the holder of a mining lease has been in production for more than one year he may obtain a fee simple patent of the mining rights or mining and surface rights (Section 96 of the **Mining Act**). Patented claims are subject to Acreage Tax of 50 cents per acre per year under Part XIV of the **Mining Act**. Once a patent for mining and surface rights has been granted, the holder may use the land for any purpose. Since 1965 only a few patents have been issued.

ISSUES

From 1965, the 21-year renewable lease replaced both of these earlier forms of perpetual title. Under the **Mining Act**, holders of mining licences of occupation and 10-year leases can convert them to 21-year leases. However, they do not choose to do so because the renewal rentals for these long term leases are subject to increase and to the "January 1, 1990" ruling.

Except for non-payment of rentals, the present **Mining Act** does not provide a mechanism for revoking these old licences and leases. Therefore, many of these mining lands lie dormant and unexplored. In addition, there is no mechanism for increasing the annual rental or for renewing these leases. Section 95 sets the rental at $1.00 an acre with a $10.00 minimum annual rent for the leases on renewal. Section 44 of the Act sets the annual rental for a licence of occupation at $1.00 an acre with a $5.00 minimum annual rent. No term is specified.

RECOMMENDATIONS

Given that a basic principle is to ensure that the limited amount of mining lands within the province is actively explored and developed in an orderly and expedient manner to the benefit of Ontario, the following approach is recommended:

- **Consolidate the many Sections within the Act for conveying land tenure.**
- **Issue a lease once the claim holder has demonstrated that a significant mineral deposit is present. (The issuance of a mining permit is addressed in Chapter II.)**
- **Encourage the return of idle mining lands to the Crown for further exploration and development, by issuing a lease only when a significant deposit has been outlined on the property.**
- **Establish a mechanism that would encourage continued exploration of mining lands conveyed in the past.**

THE SETTLEMENT OF DISPUTES

The present office of the Mining and Lands Commissioner was established by legislation enacted in 1906. The jurisdiction of the office has remained essentially the same since pre-Confederation days. From the time of the 1864 **Gold Mining Act**, justices of the peace, arbitrators and tribunals appointed by Order-in-Council have, at various times, been part of a system of administration of the **Mining Act** which has consistently excluded the courts.

Under the 1906 amendments, the Commissioner was to decide on all disputes regarding unpatented mining lands, on appeal from or when referred by a Mining Recorder. Over the next 18 years, the jurisdiction of the Commissioner was amended to include granting relief from forfeiture and vesting the interests of delinquent co-owners in other co-owners who had, in fact, performed assessment work.

In 1924, the Mining Court of Ontario replaced the office of Commissioner. The jurisdiction of the Court was substantially the same as that of the Commissioner. In 1956, the Mining Commissioner's office was reinstated and replaced the Court. The powers and procedures of the Commissioner under today's **Mining Act** are similar to those of the courts, although proceedings easily accommodate participants without legal counsel and provide quick settlement of disputes. The Commissioner is appointed by Order-in-Council under the **Ministry of Natural Resources Act**. The Commissioner also exercises dispute resolution jurisdiction under the **Beach Protection Act**, the **Conservation Authorities Act** and the **Mining Tax Act**.

RECOMMENDATION

The Mining and Lands Commissioner provides a quick and effective means of settling disputes and accordingly, the Office of Commissioner should be retained.

EXTENSIONS

Once a mining claim is staked, the holder must carry out certain work activities in order to maintain the claim in good standing. If claim holders do not carry out their obligations within the prescribed time frame, they must apply for an extension or forfeit their claims.

The total number of active claims in Ontario has increased dramatically over the last 10 years from under 40,000 in 1978 to more than 150,000 in 1987. This major increase in activity is due to the Hemlo gold discoveries in the early 1980s and the introduction of tax benefits obtainable via "flow-through shares." High volume Mining Recorder offices, such as those located in Timmins or Thunder Bay, now administer almost as many claims as were previously administered province-wide.

The growth in active claims has led to a large increase in assessment work submitted and an increase in the number of "extension of time" orders issued by the Mining and Lands Commissioner. These orders are granted to protect a claim holder's interests while activities are completed which will maintain the claim in good standing. Holders may apply for:

- extension of time for performance of work;
- relief from forfeiture and extension of time for filing a work report;
- relief from forfeiture and extension of time for performance of work; and
- extension of time for applying for and paying rental for a lease.

The timing of the application determines whether the holder must apply for an extension of time only or for a relief from forfeiture as well. The following table presents a breakdown of this activity.

EXTENSIONS AND RELIEF FROM FORFEITURE

FISCAL YEAR	EXTENSIONS FOR WORK AND LEASE	NUMBER OF CLAIMS RECEIVING EXTENSIONS PRIOR TO DEFAULT	NUMBER OF CLAIMS RELIEVED FROM FORFEITURE
1978 - 79	858	8,147	871
1979 - 80	1,046	8,434	694
1980 - 81	1,336	11,957	1,329
1981 - 82	1,430	13,692	1,801
1982 - 83	1,411	13,675	1,863
1983 - 84	1,703	19,960	3,714
1984 - 85	2,032	26,129	5,156
1985 - 86	1,944	21,573	3,434
1986 - 87	2,228	25,640	3,421
1987 - 88	2,706	34,350	4,951

Source: Ontario Ministry of Northern Development and Mines 1988

ISSUES

In the 1987-88 fiscal year, nearly 40,000 claims were granted extension of time or relief from forfeiture and extension of time through the issuing of more than 2,500 orders. This is an administrative process which requires review.

The current landholding system leads to last minute activity to complete work requirements. The original holder of the claims may only wish to sell the claims and has no intention of completing the necessary assessment work. If the claims are not sold and the anniversary date is approaching, then the holder must take steps to protect the investment; this may involve rapid procurement of assessment credits, or purchase of time through obtaining an extension of time, or relief from forfeiture and extension of time. Where there are no adverse interests, the acquisition of such orders is primarily an administrative procedure. Many holders abuse the system intentionally while others hold more claims than they are capable of managing correctly.

There are also some bona fide reasons for extension of time, including: illness, litigation, closure of lands due to forest fire hazard, reduction of assessment credits, late acquisition of funding, unavailability of contractors to carry out work, delays due to surface rights holders, and extreme weather or physical conditions. Clearly, some provision is required to allow for extensions of time for valid reasons, while eliminating abuses.

OPTIONS

Maintain Status Quo.

Refusing extensions to habitual offenders is an administrative procedure which could improve the situation and would require only policy and procedural changes. However, maintaining the status quo would continue to foster poor management practices.

Payment in Lieu of Work.

In some jurisdictions, claim holders who are unable or unwilling to accomplish the necessary assessment work on schedule may make payments to the Crown in lieu of completing the work. Such an approach would probably result in the early surrender of numerous claims. The negative side of the approach is that it is a rental or time-buying system, which does nothing to find mines.

A One-Time Only Extension.

The concept of a one-time only extension of time during the life of a claim was proposed some years ago. This embraced the principle of "work it or lose it" except under extenuating circumstances (e.g. illness). The principle is a good one in that some discretion is involved but only on a limited basis.

Change in Administrative Procedure.

At present, the authority to grant extensions of time is primarily vested in the Commissioner. This authority could, perhaps, be delegated to the Mining Recorder. Relief from forfeiture could also perhaps be delegated to the Mining Recorder, with the possible exception of cases where adverse interests are involved.

RECOMMENDATION

Allow claim holders, who are unable to carry out the required assessment work for bona fide reasons, to pay cash in lieu of work.

COMPENSATION FOR SURFACE RIGHTS OWNERS

Under Section 92 of the present **Mining Act**, the surface rights owner (when not the prospector or claim staker) is entitled to compensation for any damage inflicted by the prospector, in the past, present or future. According to Section 57, the prospector has to reach agreement with the surface rights owner over any damage or injury sustained (then or in the future) before a certificate of record can be issued. The prospector cannot obtain a lease until the certificate is issued, so this provides a very strong incentive for the prospector to settle damage claims.

As it is difficult to assess "future damage," this requirement has led to a practice of a secondary agreement which allows for additional compensation in the future, if justified. This practice is not satisfactory, in that it demonstrates a failure of the legislation to address a real need.

ISSUES

With the current legislation, problems may arise when the prospector obtains a certificate of record, does more work and produces more damage. The settlement already made for future injury and damage may be insufficient compensation for the latest harm done, and the surface rights owner has no further recourse under the **Mining Act.**

In other cases, the prospector may, for one reason or another, decide to abandon his claim before it is brought to lease. When that happens, there is no requirement in the **Mining Act** for the settlement of any damage claim. A civil suit can be brought through the regular court system but this can be onerous, time consuming and expensive for the surface rights owner. It may also be unproductive if the prospector does not have enough assets to pay damages.

OPTIONS

The issue of compensation can be resolved by allowing the surface rights owner a right to compensation for damages at the time the property suffers the harm. The prospector would no longer be required to make settlement for future claims at the time of obtaining a certificate of record. There would always be recourse to the Mining and Lands Commissioner for the adjudication of disagreements.

To solve the problem of unsatisfied awards due to insolvency, prospectors could be required to post a bond for every prospecting project. However, a bonding system would place a financial load on the prospector and also entail a significant administrative load for the government.

Another option would be to establish a fund to pay surface rights owners for any unsatisfied judgments. The fund could be financed by government (to encourage prospecting), by the mining industry (for the same reason), or by prospectors themselves through a portion of their fees. In any case, if a prospector were to default in paying a judgment, the prospector's licence would be suspended.

IMPROVED COMMUNICATION

To ensure that surface rights owners are aware of prospecting, exploration or impending mine development on their properties, legislation should require that registered mail notice be given to the surface rights owner by the prospector before any work was undertaken.

Similarly, notice of prospecting could be sent by mail to any occupiers of land that are on, close to, or likely to be affected by operations on the projected area of exploration. The notice could also include material describing the rights of the prospector in this search for minerals. Early notice of actions that can possibly affect another party is more likely to gain acceptance of the actions than a startling revelation at the time of the project.

CHAPTER II

ADVANCED EXPLORATION, DEVELOPMENT, PRODUCTION AND CLOSURE

2.1 INTRODUCTION

This Chapter examines the issues surrounding the advanced exploration, development, production and closure phases of the mining sequence. It proposes a new administrative approach which will promote the interests of both the industry and the public in mining development while maintaining the Government's responsibilities as steward of the Province's mineral resources.

A new approach is necessary in order to address the public's increasing concerns over resource developments, while maintaining the mining industry's confidence in the fairness of the process for new mine developments in Ontario. While the public's need to be consulted (about developments which may affect their interests) has become an important component of government processes, it is critical for the corporations concerned and their investors that any new legislation provide a framework which allows corporate decisions to be made without being unduly delayed by government requirements. The existing overlap and complexity of information requirements do not provide an appropriate vehicle for public consultation, or any certainty to the industry about the requirements which must be met in the development of a mine.

Ontario is not alone in facing this issue. The approaches used for its resolution have been varied, for example:

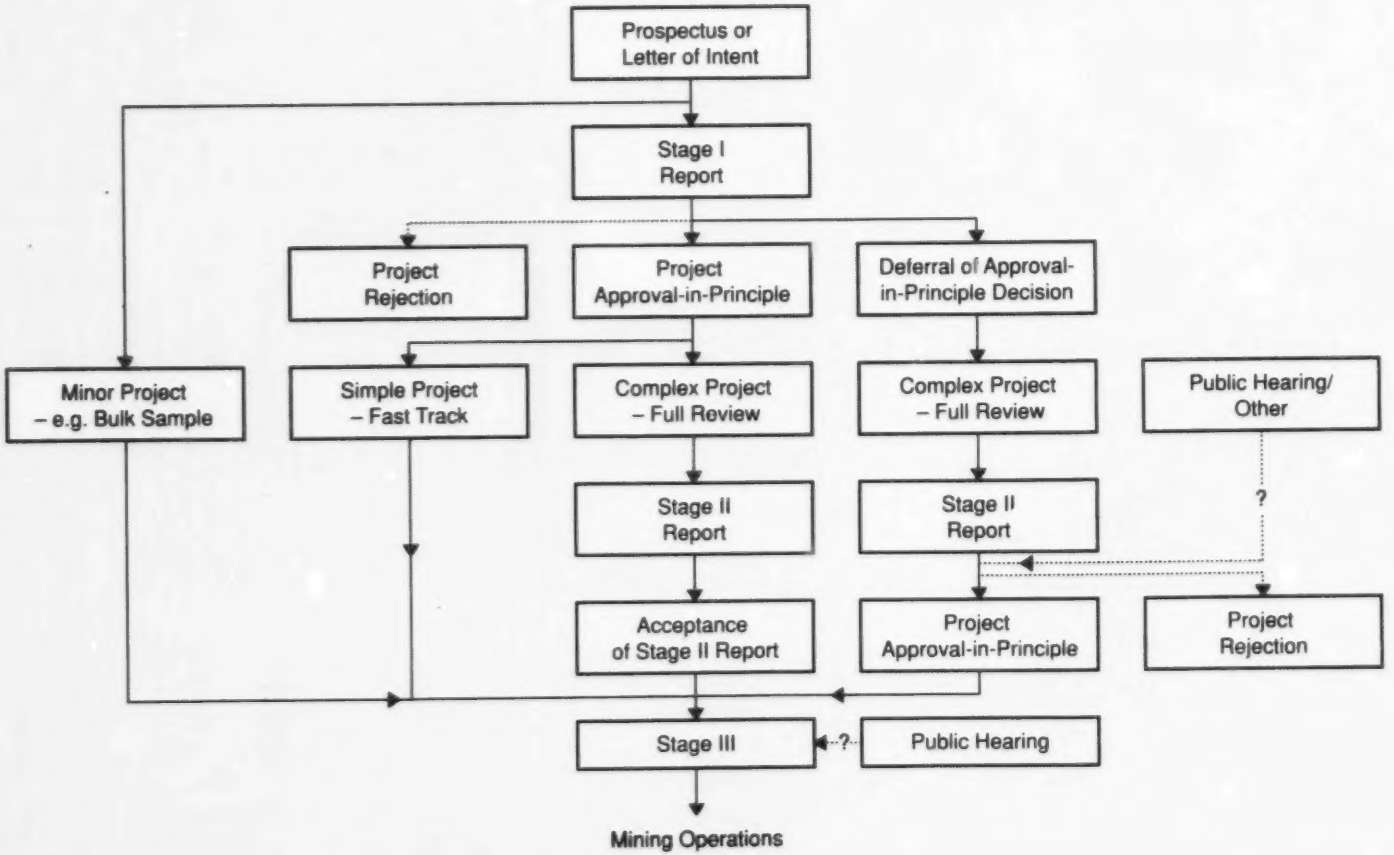
- In some areas of the United States, detailed environmental impact statements are required to define the anticipated impacts of the project on the total environment. This process requires that the approval authority implement sophisticated evaluation procedures in order to properly assess those impacts.
- In Colorado, the submission is judged by the government mining agency for its significance. If it is deemed to be a major project, an ad hoc body of government and public interest representatives is convened to reach a legal agreement on the timing of issuing permits - provided the proponent supplies certain information by specified dates.
- The British Columbia "Mine Development Review Process" uses a more complex and formal system, as shown on the accompanying figure. This process requires the proponent to submit a "prospectus" on the project and the government then decides on one of two tracks for approval. The "fast track" allows for immediate approval of minor projects having minimal impacts, while the other track can require one or more reports from the proponent covering the project in more detail (e.g., environmental impact, economic impact, etc.) and can result in approval-in-principle, with or without public hearings before getting full approval. The procedure has been well received by the industry.

Current concerns relate not just to the opening of new mines but also to the safe operation of existing mines and the reclamation of mining sites upon closure. Even though the majority of mine operators have been good corporate citizens according to the laws and mores of their day, the mining industry has not enjoyed a spotless reputation. Some companies have displayed exemplary behaviour and have properly reclaimed exhausted mines. The example set by these firms has shown that reclamation need not be overly onerous or expensive and that, through good planning, industry should be able to accommodate any reasonable requirements for reclamation at low cost.

Concerns about operations and closure have also been addressed in different ways in other places. For example, some jurisdictions have reserved the right to approve ore extraction methods in order to prevent companies from mining only the highest grade material ("high-grading"), a practice which leads to early exhaustion of a mine. Elsewhere, proponents are required to address the questions of closing the operation and to provide a plan for the eventual safe abandonment of the mine site. Notably, a recent report of a federal-provincial-industry committee discusses the components of an ideal reclamation law. (See *Report on the Economic Policy Aspects of Acid Discharge.)*

Much work is now under way, both in Canada and elsewhere, to find solutions to the problems of

MINES DEVELOPMENT REVIEW PROCESS
(BRITISH COLUMBIA)



Source: British Columbia Ministry of Energy, Mines and Petroleum Resources 1988

abandonment which are stable, and which do not require further work to assure continued public safety and a pleasing aspect to the site. New legislation should be flexible enough to encourage innovative procedures for reclamation and alternative uses for the reclaimed land.

The current trend throughout the world is toward examining all aspects of a project in much greater detail, starting at an early stage before a production decision has been made. The examination is concerned not only with the immediate impact but also with the questions of closure. Ontario must address the same concerns.

Ontario's current **Mining Act** does not deal with these concerns effectively: it does not provide for any co-ordinated review of a mining project; it does not require public consultation on mining projects; it does not deal appropriately with the questions of mine closure.

This paper responds to the new needs of society and recommends a system that requires a co-ordinated handling of a proponent's applications to the various ministries concerned. The Ministry of Northern Development and Mines would be the legislated lead agency and the co-ordinator of a process which would require contact among the proponent, the regulators and the public.

RIGHTS AND RESPONSIBILITIES OF THE MINING INDUSTRY

Under the existing **Mining Act** a prospector is entitled to a mining lease and a grant in fee simple if certain requirements are met. This certainty provided under the **Mining Act** has been characterized as a "right to mine" and has served Ontario well over the last 80 years. The proposed new planning and approval process will clarify the requirements for mine development, but the "right to mine" should be preserved so that it continues to serve the interests of Ontario.

However, with rights go responsibilities. Some of the responsibilities of the mining industry, particularly as viewed by present-day society, have not previously been incorporated in the **Mining Act**. It is proposed that the proponent's responsibilities for notification, consultation, reconciliation and reclamation be included in the revised Act.

The fundamental objective of this approach is to ensure responsible engineering and operations by all mining operators, at all times. This objective has to be reached by balancing the operator's right to corporate confidentiality and the government's and the public's right to know. It is therefore critical to achieve an effective, mutually satisfactory reconciliation between the needs of the public, the mining industry and the government, without discouraging investment in mining in Ontario.

2.2 THE MINING SEQUENCE

"Mining" is not a static procedure. In this paper the term includes any operation leading to the establishment of a mine (even though the operation may be abandoned before production), the production phase of the mine and the stages up to and including rehabilitation and abandonment measures.

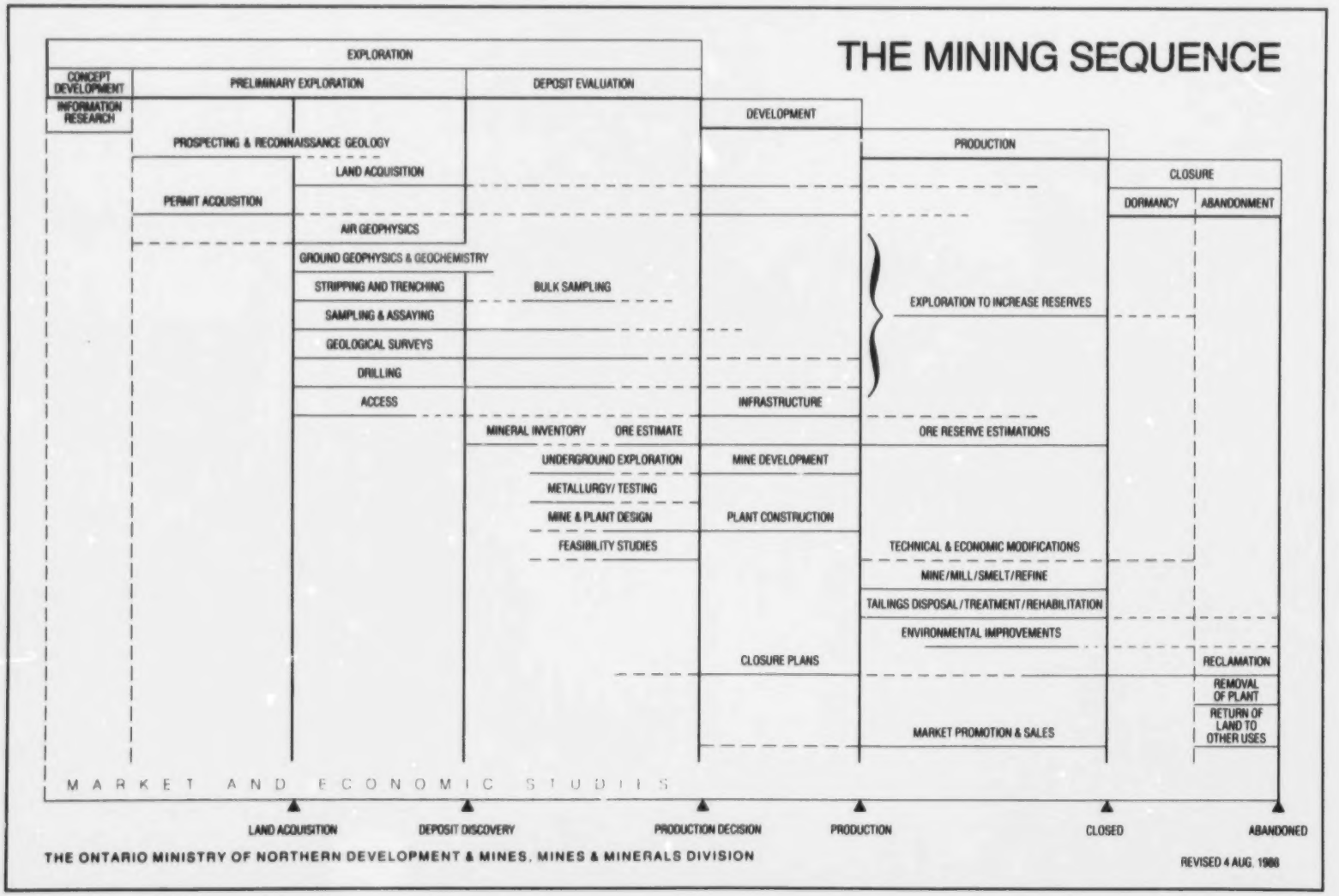
As shown on the accompanying figures, the sequence is divided into four distinct phases: exploration, development, production and closure. The sequence also contains definite points at which the nature of the activity changes: land acquisition, deposit discovery, production decision, production, closure and abandonment.

In terms of numbers, the exploration phase is by far the most active - the accepted rule of thumb is that it requires about a thousand exploration ventures to yield one economic deposit. An average exploration project requires the expenditure of hundreds of thousands of dollars; a few are carried out for less but some cost millions. The great majority never come to fruition as mines. Nonetheless, these projects create an active exploration industry, mainly in Northern Ontario.

Exploration operations may include:

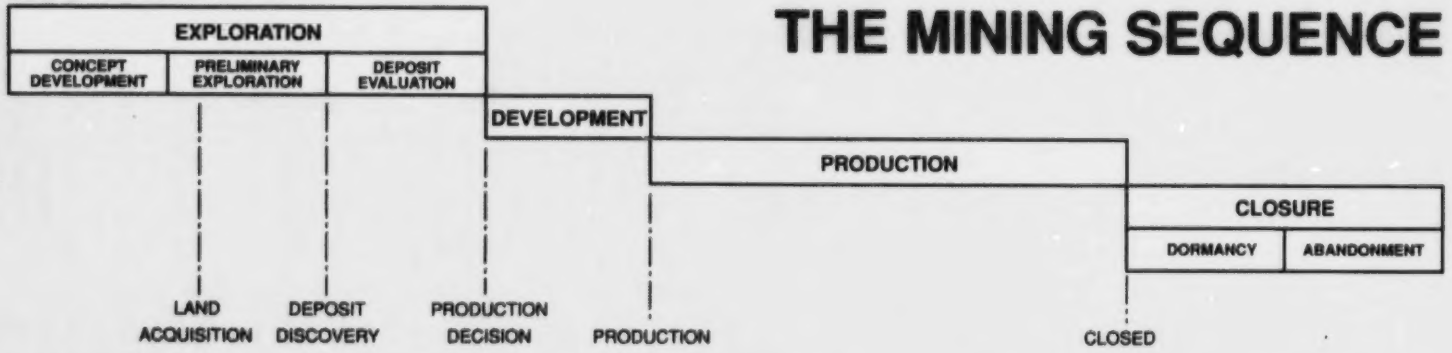
- researching old records in a library or office;
- studying geological information with respect to one or more target minerals;
- prospecting at the site;
- performing airborne geophysics (using instruments to log the magnetic and electrical characteristics of the ground);
- making regional geochemical surveys (chemical analysis of rocks and soils for indicators of mineralization);
- executing detailed geophysical and geochemical work on the ground;
- trenching;
- diamond drilling (to recover samples of rock from below the surface).

These activities of initial exploration may lead to a deposit discovery. In order to establish whether the deposit is economic, much more exploration activity is then undertaken to define the deposit so that an initial ore estimate can be made. It is usually at this stage (if at all) that a shaft would be sunk for underground exploration - allowing for the extent of the ore body to be defined more accurately. A bulk sample, of hundreds to thousands of tons, might be extracted at this stage to establish the grade more



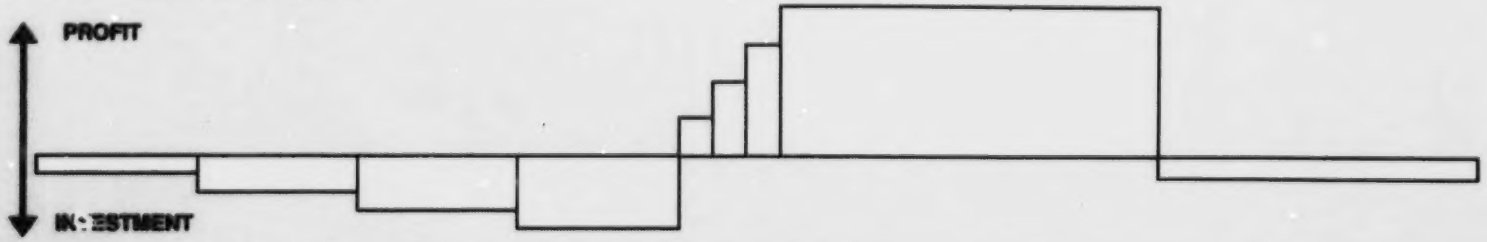
Source: Ontario Ministry of Northern Development and Mines 1988

THE MINING SEQUENCE



CHARACTERISTICS		Time in Years	Costs in $Millions	Employment
Exploration	Concept development	1–2 Years	0.05–0.1	5–20
	Preliminary Exploration	1–15 Years	5–25	5–20
	Deposit Evaluation	2–4 Years	1.5–20	5–20
Development		1–5 Years	5–200	30–500+
Production		← Extremely wide ranges →		

CASH FLOW SCHEMATIC



Source: Ontario Ministry of Northern Development and Mines 1988

accurately and to permit metallurgical test work which would be the basis for designing a processing plant. Once these data on the size, grade and metallurgy of the orebody have been obtained, a feasibility study is completed which forms the basis for making a production decision.

The production decision must be based on all of the economic factors related to mineral production - including the reclamation costs and the costs to provide assessments and reports to government agencies to allow them and the public to evaluate the environmental and other impacts of the proposed project. The time required to obtain approvals or to accommodate the concerns of interest groups must also be factored into the decision.

If a decision is made to produce at the property, the project moves into the development phase. At this time substantial additional investment is needed to put the infrastructure in place for a complete mining operation, to develop the mine, and to install the plant.

The production phase is the wealth generator which justifies all the previous investment. However, further investment may be made for exploration in order to prove new ore reserves, make modifications in the plant, increase the rate of production or reduce the process costs.

After production comes closure. This phase can be described as falling into three sub-phases, as follows:

- "Closed" means that production has ceased but there are still personnel at the site to maintain safety and the integrity of the plant.
- "Inactive" is used to mean that the mine is closed, no personnel are at the site and safety is assured by engineering works that prevent the possibility of accidents.
- "Abandoned" means that the shafts have been capped, tailings dams stabilized, surface structures removed and the land rehabilitated to a state suitable for other uses. This typically occurs after a lengthy period of inactivity or when the owner has or is about to surrender the mining rights - or when the Minister has declared the site abandoned.

2.3 THE EXISTING MINING ACT

Ontario's **Mining Act** deals effectively with the preliminary exploration phase of the mining sequence and is most concerned with the land acquisition process. Many other provincial - or in some cases federal - statutes affect the other phases of the process. For example: approvals are required under the **Public Lands Act** before some types of exploration work can proceed; the Ministry of Labour regulates work place conditions; emissions and effluents are covered by the **Environmental Protection Act** and the Ontario **Water Resources Act.**

Neither the **Mining Act** nor the Ministry of Northern Development and Mines is formally involved in any of these approvals, although proponents often seek advice from Ministry staff on procedures for obtaining other necessary approvals. This advice can be invaluable when mine developers are faced with regulations designed for manufacturing plants which may be difficult to apply to a mine setting. In addition, the Ministry now performs an advisory function to the staff of other agencies who are not familiar with mine development.

On the whole, Ontario's system has worked well to provide for mine development while protecting the environment and the interests of the public. What is lacking, however, is a process for bringing together the disparate requirements of the proponent, the public and the regulatory agencies. Any such process would need to recognize the legitimate interests of affected public groups, the need of the industry for certainty about the requirements with which they must comply and the expertise that resides in regulatory agencies charged with the administration of existing legislation.

2.4 A NEW LEAD AGENCY APPROACH

This paper proposes an administrative process which would provide the proponent with one initial government contact point. That contact would act as a guide to the proponent in identifying the approvals required before the project could proceed and would also be responsible for informing all other agencies of the proposal in order for them to be able to assess its impacts and define their requirements for project approval. This proposed new approach is designed to facilitate the approvals process for all phases of the mining sequence by reducing duplication of information while still obtaining the necessary data to be able to grant the approvals.

The process is also designed to ensure that public interests, including those of natives, are recognized and accommodated by the proponent to achieve mutual satisfaction. Accordingly, public consultation would be a requirement of the revised process. The process could provide for one public notification procedure which would meet the requirements of all relevant legislation. Depending on the location and impact of the proposed development, methods for public consultation could include meetings with interested groups, public meetings or notices soliciting responses. A time limit would be specified for the filing of public concerns.

The staff of the Ministry of Northern Development and

Mines includes mineral development co-ordinators in the two Northern Regions and in Toronto to service the field and head offices of the mining and exploration companies. Their current function is to facilitate companies' applications for approvals and they would play a vital role in the proposed process. In addition, these co-ordinators, in consultation with the Ontario Native Affairs Directorate, will notify proponents of the special relationship that Native people have with the Crown. Access to advice and clarification on the current status of ongoing discussions and negotiations, respecting the specific area of interest, will be provided.

RECOMMENDATIONS

Require the Ministry of Northern Development and Mines to provide a facilitator to co-ordinate and expedite communication between the proponent, the public and all Ministries and Agencies from which approval is required for any mining project.

Require the facilitator to provide prompt notice to all other Ministries and Agencies whose mandates, programs or clients may be affected by a mining project.

In order for the process to be effective, it requires early notification to government of an intention to carry out work of advanced exploration or development. This process of early notification would allow the proponent to be made aware of possible hindrances, such as the existence of an environmentally sensitive area near to the work. In addition, it is in the proponent's best interest to give prompt notice to the government to facilitate the timely building of any public sector infrastructure required to support the mine, such as roads and power lines.

Another important benefit of early notification would be the ability of nearby communities to plan for the development and for the impact of the mine on their population and the services provided.

Just as with the case of a new mine, early notification of a mine closure would facilitate necessary approvals and adjustment by nearby communities to the changed circumstances.

RECOMMENDATIONS

Where advanced exploration involving underground development or significant surface disturbance is to be undertaken, require the proponent to give the Ministry of Northern Development and Mines information on the operations that are planned as well as the proponent's plans for the mitigation of potential residual safety hazards or the reclamation of damage to the environment.

Require any proponent wishing to develop a mine, to give notice to the Ministry of Northern Development and Mines.

Where a new mine is to be developed, require the proponent to file with the Ministry of Northern Development and Mines an outline of the development and a closure plan with the estimated cost.

Require public notification of any proposed mine.

At present, no specific approval for "mining" is required under any legislation. Rather, separate mining activities are addressed in different statutes, administered by different agencies. These legislative requirements arise at different points in the mining sequence.

This situation causes confusion in the industry and for the public. Citizens interested in providing input cannot identify the point at which their concerns will be addressed and this often causes them to misunderstand or mistrust the procedural approvals - such as the issuance of a permit to do exploratory work - which do not imply that the government has sanctioned a new mine going into production. The industry complains that it has no fixed point at which it can assure investors that a project has been approved; it needs to know "the rules of the game."

In order to provide clarity to the process it is proposed that land tenure be assured by the issuance of a lease, once the claim holder has demonstrated the presence of a significant mineral deposit. The Minister of Mines would issue a mining permit when all necessary approvals to mine have been obtained and the public has been provided with an opportunity to express its concerns. The purpose in proposing this new permitting system is only to provide co-ordination of government activities and allow for certainty in the industry. All existing legislation would continue to apply to mining projects, as would any new legislation developed after the introduction of the new system.

The Minister of Mines would not issue the permit under the **Mining Act**, until he had been notified by all ministries that no concerns remained to be addressed by the proponent before putting the mine into operation. For instance, when the Ministry of Health requires procedures to be followed in the establishment of a mining camp or the Ministry of Natural Resources has to issue a licence to take sand or gravel from a beach, or the Ministry of the Environment requires mitigation measures under an environmental statute, then all such procedures under the appropriate Acts would apply. Once these procedures had been completed, the Minister of Mines would be assured that all requirements had been satisfied and the Mining Permit could be issued. Staff of the Ministry of Northern Development and Mines would

be responsible for assisting the proponent in obtaining the necessary approvals, as expeditiously as possible, from the appropriate ministry but the responsibility of that ministry to deal with matters within its jurisdiction would remain.

The new permit would only apply to the development of a producing mine. Advanced exploration activities, such as the sinking of an exploratory shaft or surface stripping would proceed in advance of the issuance of a permit, and would continue to be regulated by the agencies concerned with those activities - although the Ministry of Northern Development and Mines would be involved in assessing the impacts of the exploration activities and assisting in obtaining the approvals.

A specific type of advanced exploration activity, bulk sampling, requires the extraction from the ground of large quantities of material - often thousands of tons. This procedure can cause concern because of the perception that the mine has gone into production, although that is not the case. It is proposed that the specific approvals for bulk sampling now contained in Section 62 of the **Mining Act** be replaced by a permitting system which recognizes the preliminary nature of the bulk sampling activity, but still provides for all of the necessary approvals to be obtained from other agencies.

RECOMMENDATIONS

Provide that no mine can begin production until it has received a permit to mine from the Minister of Mines.

Require that the mining permit not be issued until all other required approvals have been granted and a closure plan has been approved.

Provide for a specific approval process for bulk sampling.

Whenever an operation is undertaken that could result in a residual hazard or damage to the environment, a reclamation procedure should be developed for the site and documented in the closure plan the proponent would be required to submit. The procedure should be an integral part of the plan for the operation itself and should be up-dated at intervals until the mine closes.

The plan would address each sub-phase of the closure, showing measures to be taken when the mine is initially "closed" (ensuring that personnel are maintained on the site to protect public safety), and the safety precautions to be implemented when the mine moves to the "inactive" sub-phase. It would be a requirement that technical information relating to the mine be filed with the Ministry of Northern Development and Mines at the "inactive" stage for the enhancement of the geoscientific database.

The closure plan would also detail the necessary preparations for "abandonment," including the plans for the removal of all surface structures, the execution of engineering works to assure long-term stability of tailings and site reclamation procedures that would allow for a variety of alternate uses of the area.

Effective reclamation has three important outcomes: the safety and pleasure of the public on visiting the abandoned site, the present and future protection of the environment and the suitability of the site for original or alternate uses. For example, safety considerations should require a professional assessment of the competence of crown pillars and the potential for surface caving; environmental concerns could call for re-vegetation to a condition similar to the original cover; an alternate use for a site with an abandoned open pit could be the formation of a lake.

Notice to government of any sub-phase of closure would result in the mine operator immediately executing the appropriate operations detailed in the closure plan.

The closure plan should include a cost estimate which would be included in the information provided before the mining permit is issued. When the closure plan has been accepted, the proponent would be required to deposit a financial assurance based on that cost estimate. The deposit would be held until the area was reclaimed and vegetation well established.

The financial assurance could take the form of a letter of credit drawn upon a Canadian chartered bank, a surety bond of an appropriate insurance company, a cash deposit, or any other security acceptable to the Minister. It would be based on the cost estimate of all reclamation procedures needed to rehabilitate the site, whether it be an exploration shaft or a major mine and metallurgical site.

The financial assurance would not necessarily remain static through the life of the mine but would be reviewed periodically. During the mine development and production phases, the amount could be progressively built up. Any revision of the closure plan that showed additional work to be necessary would require an increase in the amount; conversely the amount would be lowered if less work was needed. Any reclamation work carried out by the operator before abandonment could be cause to revise the amount downwards.

It is proposed that any other bonding or financial assurances required by other legislation should be incorporated into the financial assurance under the **Mining Act**. The amounts to be made available to other ministries and the procedures for release of the funds should be mutually agreed to by the ministries concerned at the time the financial assurance is determined or revised.

In a case of default, the Minister would notify the operator that a state of default exists and that the operator must rectify the situation within a given period of time. If the operator fails to remedy the default, the Minister could use the financial assurance to correct the situation. If the operations continued after such correction, the Minister would reassess the amount of the financial assurance.

Even with the best of engineering, the perpetual safety of abandoned mines is not certain and exceptional events could occur after a company has been released from its bonding. As insurance against such an event, a reclamation fund should be established.

RECOMMENDATION

Once a closure plan has been accepted by the Government, require a financial assurance to be deposited (based on the cost estimate of the closure plan), to be held until reclamation is complete.

The proposed new process, in summary, would include the following steps:

1. Claims are staked and recorded
2. When the proponent gives the Ministry of Northern Development and Mines an acceptable indication of a significant mineral deposit on the claims, a lease is issued (see Chapter I).
3. Notice, including details, of a planned mine development is received by the Ministry of Northern Development and Mines from the proponent.
4. Circulation of details to appropriate Ministries for objections, or additional information requirements to be sent to the proponent within a specified period.
5. Approvals of other agencies are obtained by proponent as required.
6. Rehabilitation or mine closure plan is approved by the Ministry of Northern Development and Mines, financial assurance amount is set and security is posted.
7. Minister of Mines issues permission for the proponent to proceed.

This procedure can be very short for uncomplicated projects having a low impact on the total environment. For other projects, it may involve an inter-ministerial staff meeting where the proponent makes a presentation on the project, and consultation with the public by an appropriate means. The services of a facilitator from the Ministry of Northern Development and Mines would be available to assist the proponent and the other agencies as required.

In the case of mine closure or abandonment the process would be as follows:

1. Operator notifies the Ministry of Northern Development and Mines of the impending closure or abandonment.
2. Examination and agreement between the operator and the Ministry on the closure plan to be executed.
3. Monitoring of the closure by the appropriate agencies and acceptance by the Ministry of Northern Development and Mines of the closure or abandonment.
4. Release, as appropriate, of the financial assurance.

2.5 OTHER RELATED ISSUES

CONFIDENTIALITY

Confidentiality is of vital importance to the mining industry. This issue is examined further in Chapter III in the context of the **Freedom of Information Act**. In addition to the provisions of that legislation, however, the corporate interest in maintaining the confidentiality of information leading to corporate decisions must be recognized. Security of information can be a problem when material is scanned by several ministries in the course of their duties. In view of the sensitive information the government will require, new legislation will contain provisions to place this information beyond the reach of unauthorized personnel.

RECOMMENDATION

Require all government agencies in receipt of confidential corporate information to provide access to that information only to authorized personnel.

EXISTING MINES

In order to provide for the closure and reclamation procedures in existing mining operations it is proposed that the provisions of the new legislation would be applied to those operations within a specified period after the proclamation of the new legislation.

RECOMMENDATION

Require existing mining operations to conform with the requirements for closure plans and financial assurances within a specified period.

CHAPTER III

INDUSTRIAL MINERALS, DOMESTIC PROCESSING, INCREASED USE OF REGULATIONS, CONFIDENTIALITY

3.1 INDUSTRIAL MINERALS

An industrial mineral is a non-metallic, non-fuel mineral such as talc, salt and silica, that is extracted and processed for industrial end-uses. Structural materials such as sand, gravel, clay, crushed stone, building stone and manufactured products like cement and bricks or refractories are also regarded as industrial minerals. Industrial minerals are characterized by their diversity of origin and occurrence, the range of production volumes and the variety of end uses. They are frequently extracted from open pit mines or quarries. The prospects for future growth in this sector are high in comparison with metallic and fuel minerals. There are numerous opportunities to expand into both domestic and export markets. In Ontario, in 1987, the value of production for non-metals and structural materials exceeded $1.5 billion.

At present, the surface mining of industrial minerals is controlled by three separate pieces of legislation: **The Pits and Quarries Control Act, the Beach Protection Act** and the **Mining Act**. Underground mining of industrial minerals is controlled by the **Mining Act**.

The Pits and Quarries Control Act, which is administered by the Ministry of Natural Resources, provides for the regulation and licensing of all surface industrial mineral mining operations that are situated on private lands in designated areas of the province. Designated areas currently include most of Southern Ontario and some townships around Sudbury and Sault Ste. Marie, as well as a few islands north of Little Current. The **Beach Protection Act**, which is administered by the Ministry of Natural Resources, provides for the regulation and licensing of removing sand from private or Crown land which is associated with the bed, bank, beach, shore or waters of any lake, river or stream.

Part VII of the **Mining Act** deals with quarry permits for industrial minerals on Crown land and is currently administered for the Ministry of Northern Development and Mines by the Ministry of Natural Resources. Part VII has not been changed for many years and does not adequately reflect the present need to administer industrial minerals consistently on both Crown lands and private lands. In addition, the provisions for plan submissions and the requirements for rehabilitation are inadequate and do not reflect current public expectations.

The Pits and Quarries Control Act is currently used to regulate and administer all surface-mined industrial minerals in designated areas.

The **Aggregate Resources Act** was tabled for First Reading in the Legislature on June 27th, 1988. This Act will replace all the above legislation, and will regulate all surface industrial mineral mining operations on all Crown lands and private lands in designated areas of the province. It will also regulate the development of industrial minerals on Crown lands which are not held under mining leases (one can still obtain a lease under the **Mining Act** to "mine" industrial minerals).

By currently including all surface-mined industrial minerals under the **Aggregate Resources Act**, the regulation of all surface-mined, non-structural industrial minerals is substantially improved until new mining legislation is in place to provide for effective administration and regulation of these open pit industrial mineral mines.

RECOMMENDATIONS

Include in the Mining Act all conventional industrial mineral surface-mining operations on private and Crown lands, with the exception of structural industrial minerals including aggregates such as sand, gravel, crushed or broken stone, cement, lime, structural clay products and similar commodities (which would continue to be administered under the Aggregate Resources Act).

Include in the Mining Act, for the surface-mining operations of industrial minerals, requirements for quarry permits, operating and rehabilitation plans, financial assurances and transfers of permits.

3.2 DOMESTIC PROCESSING

According to Section 104 of the **Mining Act**, mine operators are required to treat, refine or process all ores and minerals, in Canada, to "refined metal or other product suitable for direct use in the arts." An exemption may be given by Order-in-Council. The Minister may determine the stage of refinement at which any mineral substance is refined metal or other product suitable for direct use in the arts without further treatment.

The domestic processing condition of the **Mining Act** has its origins in the development of the copper-nickel resources of the Sudbury Basin. Shortly after production commenced and because of nickel's importance to the world's navies, the Government of Ontario in 1891 attempted to interest the British Admiralty in financing a nickel refinery in the province. This attempt was unsuccessful but the government's interest in domestic refining continued. At the turn of the century, the Ontario Government imposed an export tax on unrefined copper and nickel leaving the province. The Federal Government raised objections and the tax order was rescinded.

Early in World War I, rumors circulated that Ontario nickel, which was still being refined in the U.S.A., a neutral country, had been shipped from there to Germany by submarine. This rumor resulted in the Government of Ontario appointing a Royal Commission to investigate the provincial nickel industry. The report, which was tabled in 1917, recommended the establishment of a nickel refinery but also concluded that the province did not have the authority to prohibit export, or to impose a direct export tax. The reaction of the Government of Ontario was to amend the **Mining Act** by adding, to the tenure requirements of mining land severed from the Crown after 1917, the condition of domestic processing.

This amendment did not affect the operating mining companies and land previously severed. With the increasing availability of low-cost power from Ontario Hydro and the development of electro-refining, the International Nickel Co. (Inco) began operating a nickel refinery in 1918 and a copper refinery in 1930 in Ontario. Falconbridge Nickel Mines, which commenced operations in 1930 on land severed in 1915, could not operate a refinery without the payment of royalties, because Canadian patents on nickel refining were held by Inco. However, Falconbridge was able to purchase an inactive refinery in Norway, where Inco did not hold a patent. In 1970, the amendment was applied to all mining lands regardless of when they were severed from the Crown.

There has been a general upward trend in the percentage of Ontario's mineral production refined in Canada. New facilities have been constructed in the province for the refining of copper, zinc, nickel and silver and refineries in other provinces have been expanded. More than 30,000 people are employed directly in the smelting and refining industry in Canada of whom approximately 7,000 work in Ontario. While the total work force of the Canadian mining industry dropped by nearly 25 per cent between 1967 and 1987, employment in smelting and refining declined by 12 per cent. As a result, the smelting and refining work force has increased in percentage terms of the total work force and stood at 62.8 per cent of the total mining work force in 1985.

There are currently 12 exemptions to the domestic processing requirement in operation. These are shown on the table which follows. Six of these have been granted to uranium producers to fulfill supply contracts with foreign utilities. Four have been granted to nickel producers to allow them to refine offshore. The remaining two have been granted for marketing opportunities.

OPTIONS

Rigid enforcement of the domestic processing condition would require the deletion of sections 104(2) and 104(3), which allow either the Minister to determine "the stage of refinement" at which any mineral substance is suitable for direct use or the Lieutenant-Governor-in-Council to exempt any mining lands from the condition for a definite period of time. The choice then, facing the mining companies, would be between processing in Canada and not mining at all. Their decision would be based on a number of factors such as forecasted global metal demand and prices, capital requirements, return on investment, operating costs and ore reserves. Companies which could not economically justify Canadian refineries could conceivably cease operations.

This could result in mine closures, loss of employment, reduced revenue to government, and a loss of investor confidence in Ontario. Some would argue that one of the advantages of this option could be in providing more processing jobs but this could be offset by a negative change in the mining investment climate, which would affect the number of new jobs created in the future.

The abolition of the domestic processing condition would be a step toward deregulation. However, at present, the domestic processing condition provides a method to encourage processing in Canada, to monitor the inten-

LIST OF CURRENT EXEMPTIONS TO TREATING ORES AND MINERALS IN CANADA

Mining Act, RSO 1980, C. 268, s. 104 and Predecessors
As of 15 March, 1988

COMPANY	O.I.C. NO.	EXEMPTION PERIOD FROM	TO	COMMODITY	QUANTITY AND RESTRICTIONS
ALGOMA STEEL CORP. LTD.	3006/86	1987. 01. 01	1989. 12. 31	iron sinter	100,000 TPY
DENISON MINES LTD.	2324/74	1984. 01. 01.	1993. 12. 31	Uranium conc.	40,000,000 lbs.
	2524/86	1986. 09. 01	1996. 12. 31	Yttrium conc.	175 STPY
FALCONBRIDGE LIMITED	1995/79	1980. 01. 01	1989. 12. 31	Nickel/copper matte	100,000,000 lbs./ year of contained nickel
INCO LIMITED	2936/85	1986. 01. 01	1995. 12. 31	Nickel oxide	Not specified
	2935/85	1986. 01. 01	1995. 12. 31	Refined nickel sulphide	Not specified
	123/86	1986. 01. 01	1995. 12. 31	PGM conc.	Not specified
KIDD CREEK MINES LTD.	831/84	(a) 1984. 03. 01	1988. 12. 31	Zinc conc.	Not specified
		(b) 1984. 03. 01	1988. 12. 31	Copper conc.	Not specified
		(c) 1984. 03. 01	1988. 12. 31	Lead, tin conc. and residues	
RIO ALGOM LTD.	2551/75	1979. 01. 01	1990. 12. 31	Uranium conc.	17,000,000 lbs.
	2561/75	1981. 01. 01	1990. 12. 31	Uranium conc.	10,000,000 lbs.
	2575/75	1982. 01. 01	1992. 12. 31	Uranium conc.	20,000,000 lbs.
	1500/80	1979. 01. 01	1990. 12. 31	Uranium conc.	17,000,000 lbs.

Source: Ontario Ministry of Northern Development and Mines 1988

tions of the industry and to reappraise the justification for foreign processing by both industry and government. It also provides to the government a method by which strategic material can be regulated in an emergency or crisis situation. If the condition were abolished, these benefits would be lost.

In addition, Section 104 should be seen in a broader context of policies to encourage employment in resource communities. During the last decade a number of programs have been initiated at the federal and provincial levels to support and diversify employment in northern resource-based communities. Since 1985, the Ontario government has taken major steps through the Northern Development Fund, the Northern Ontario Heritage Fund and the relocation of government offices to broaden the employment base in Northern Ontario, all in a way that is consistent with the maintenance of a healthy investment climate.

RECOMMENDATION

Retain the current provisions in Section 104 of the Mining Act in order to encourage the domestic processing of the minerals produced in the Province, to monitor the processing activity and to encourage employment in resource industries.

3.3 INCREASED USE OF REGULATIONS

In the present **Mining Act**, Ontario has fewer regulatory provisions than other jurisdictions. (See the following figure.) The increased use of regulations offers the obvious advantage of ease of amendment to meet changing circumstances dictated by new technological advances, such as:

- The large mass of data required in a mineral tenure system can be managed with advanced data base techniques. These systems will allow for electronic storage and retrieval of information on individual titles. A pilot project has been implemented in the Porcupine Mining Division.
- Remote access terminals will allow users in industry and government to search and retrieve relevant information, such as details of ownership, option agreements and expiration dates, from their own offices.
- Accounting programs will be used to determine and allocate fees and taxes associated with individual titles.
- The public will have easy access to non-confidential sections of the electronic data base which will replace the need for physical handling of paper documents. This will lead to better security and less damage to original documents.
- Computer assisted drafting techniques are rapidly reaching the stage where current claim maps, at any desired scale, will be available for users in their own offices. Users will have the ability to transfer this information, via plotting techniques, to hard copies on paper or mylar for use in regional compilations or base maps for plotting exploration data.
- The facsimile machine is revolutionizing the speed and efficiency of transmitting information (including legal documents).
- The integration of various data bases (under development at the Ontario Geological Survey and elsewhere) will actually turn the computer into a powerful exploration tool.
- New and innovative surveying techniques are currently under development. These include satellite-linked instrumentation which defines precise co-ordinates of survey points. When sufficiently inexpensive and portable instruments of this type become available, convenient paper based staking (map staking) may become feasible, since it will remove one of the current objections: the difficulty of locating precise positions in the terrain corresponding to tenure boundaries on the claim map.

An awareness of the impact of these, and other potential technological developments, will be important as new legislation and regulations are drafted.

A Standing Committee of the Legislature examines all regulations pursuant to Section 12 of the **Regulations Act**. The Regulations Committee follows these guidelines:

- Regulations should not contain provisions initiating new policy but should be confined to details to give effect to the policy established by the statute.
- Regulations should be in strict accord with the statute conferring power, particularly concerning personal liberties.
- Regulations should be expressed in precise and unambiguous language.
- Regulations should not have retroactive effect unless clearly authorized by statute.
- Regulations should not exclude the jurisdiction of the courts.
- Regulations should not impose a fine, imprisonment or other penalty.
- Regulations should not shift the onus of proof of innocence to a person accused of an offence.
- Regulations should not impose anything in the way of a tax (as distinct from fixing the amount of a licence fee, or the like).
- General powers should not be used to establish a judicial tribunal or an administrative tribunal.

REQUIREMENTS IN STATUTE OR REGULATIONS

	ASSESSMENT WORK		FORM SPECIFICATIONS		STAKING RULES		FEE REQUIREMENTS		LEASE REQUIREMENTS	
	STATUTE	REGULATIONS	STATUTE	REGULATIONS	STATUTE	REGULATIONS[1]	STATUTE	REGULATIONS	STATUTE	REGULATIONS
ALBERTA		▨		▨		▨		▨		▨
BRITISH COLUMBIA	▨	▨		▨		▨		▨	▨	
MANITOBA		▨		▨		▨		▨		▨
NEW BRUNSWICK		▨		▨		▨		▨	▨	▨
NEWFOUNDLAND		▨		▨		▨		▨		▨
NOVA SCOTIA	▨	▨		▨	▨	▨		▨	▨	▨
NORTHWEST TERRITORIES		▨		▨		▨		▨		▨
ONTARIO	▨			▨	▨		▨		▨	
PRINCE EDWARD ISLAND		▨		▨		▨		▨	▨	▨
QUEBEC		▨		▨	▨	▨		▨	▨	▨
SASKATCHEWAN		▨		▨		▨		▨		▨
YUKON	▨	▨	▨		▨		▨		▨	

Legend

No	Yes
	▨

Source: Ontario Ministry of Northern Development and Mines 1988

RECOMMENDATIONS

Incorporate administrative details such as the structure of fees, approved staking methods and assessment work credits in Regulations.

Appoint a Minister's Advisory Committee on Mining Act regulations.

Require advance notice of Regulations to allow an opportunity for comment by interested members of the public.

3.4 FREEDOM OF INFORMATION ACT VS. CONFIDENTIALITY

The records to which the public has access under the **Freedom of Information and Protection of Individual Privacy Act** are extensive. As technology continues to enhance mining record-keeping systems, the Government, in its role as steward, will have to be increasingly aware of security. While the philosophy of the freedom of information legislation clearly endorses the principle that records in the possession of the government should be accessible by the public, the Act also specifically protects commercial information provided explicitly or implicitly in confidence. Personal information about individuals is also safeguarded.

RECOMMENDATIONS

Define the type of information about corporate or individual owners of mining claims to be collected, disclosed to the public, and kept confidential.

Define the information resulting from work done on mining claims to be collected and the conditions under which it may be disclosed to the public.

APPENDIX A

RECOMMENDATIONS

The following recommendations have been presented in the paper:

ACQUISITION AND RETENTION OF TITLE TO MINERAL RESOURCES

1. PROSPECTOR LICENCES:

- Require all applicants to provide suitable identification before obtaining a licence.
- Require all licence applicants to pass a simple test on prospecting, staking, surface rights holder's compensation, survival skills, etc., before obtaining a licence.
- Maintain the rights that currently accompany the licence, i.e. the right of access to Crown lands, the right to stake claims and the right to perform exploration work.
- Introduce a licence renewal system tied to the licence holder's birthday and require the holder to notify the Ministry of Northern Development and Mines of any change of address.
- Allow claim tags to remain valid as long as the licence is maintained in good standing (i.e. they should not expire on March 31 if the licence is properly renewed).
- Permit licence holders to stake as an agent for another individual or corporate licence holder.

2. STAKING PRACTICES:

- Require witness posts to be used to indicate the start and end points of gaps left in a claim boundary line where the planting of pickets or the blazing of trees would be detrimental to the interests of a surface rights owner.
- Require fluorescent flagging tape to be used to indicate that portion of a claim boundary line that traverses a private tree plantation or recreation area.
- Require witness posts to be used to indicate the true location of a claim corner where the planting of a post at the actual claim corner would be detrimental to the interests of a surface rights owner.
- Designate areas that are environmentally sensitive and identify them on the mining claim control map as being subject to modified staking and exploration requirements.
- Allow for the use of common witness posts.
- Amend the staking process to require that the time staking is completed be inscribed on the number one post. The recording process would also be changed so that the first application received in the office would be recorded unless, within 24 hours, another party presents an application indicating an earlier time of completion.
- Designate specific lands where predetermined grid areas could be acquired by map staking through application at the mining recorder's office.
- Charge higher application fees for map staking than those for claims staked on the ground.
- Permit perimeter staking, subject to regulations defining:
  - a method and standards for staking a perimeter claim, including the acceptable maximum size of a single claim, the need for line posts at set intervals along the perimeter, inscription requirements, etc.;
  - a mechanism for setting priorities among competitive stakers of perimeter claims;
  - mechanisms to allow the voluntary reduction in size of a perimeter claim and to allow a group of commonly held individual claims to be consolidated into a perimeter claim in order to eliminate concerns about interior lines and posts;
  - staking standards that would place more responsibility on the staker to mark out the claim boundaries properly in the field;
  - recording standards that would place more responsibility on the staker to illustrate accurately the area staked on the application;
  - the allowable use of assistants by the licensee staking the claim.

3. SECURITY OF TENURE:

- Introduce a provision that a claim is not disputable after it has been in good standing for a year and apply this provision to

all claims staked under the current Act.

- During the first year: raise the fee for filing a dispute, require a detailed statement of claim to accompany any dispute, and consider the right of the purchaser to re-stake claims.

4. DISCRETIONARY GRANTS OF MINERAL TENURE:

- Limit the use of discretionary grants as a means of disposing of exploration rights.
- Develop clear guidelines and qualification criteria to define those exceptional circumstances where a discretionary grant is appropriate.

5. ASSESSMENT WORK:

- Retain a system of encouraging submission of assessment work.
- Change the present "man-days" assessment work system to a "dollar-value" system.
- Set the value of required exploration work at a relatively high level initially in order to force either development or abandonment of the claim.
- Develop a system of "banking" assessment credits whereby excess work performed in one year may be "banked" and then withdrawn, as required, in future years to partially fulfil the requirement to keep these or other claims in good standing.

6. OTHER TENURE:

- Consolidate the many Sections within the Act for conveying land tenure.
- Issue a lease once the claim holder has demonstrated that a significant mineral deposit is present. (The issuance of a mining permit is addressed in Chapter II.)
- Encourage the return of idle mining lands to the Crown for further exploration and development, by issuing a lease only when a significant deposit has been outlined on the property.
- Establish a mechanism that would encourage continued exploration of mining lands conveyed in the past.
- The Mining and Lands Commissioner provides a quick and effective means of settling disputes and accordingly, the Office of Commissioner should be retained.
- Allow claim holders, who are unable to carry out the required assessment work for bona fide reasons, to pay cash in lieu of work.

ADVANCED EXPLORATION, DEVELOPMENT, PRODUCTION AND CLOSURE

1. FACILITATION:

- Require the Ministry of Northern Development and Mines to provide a facilitator to co-ordinate and expedite communication between the proponent, the public and all Ministries and Agencies from which approval is required for any mining project.
- Require the facilitator to provide prompt notice to all other Ministries and Agencies whose mandates, programs or clients may be affected by a mining project.

2. NOTICE:

- Where advanced exploration involving underground development or significant surface disturbance is to be undertaken, require the proponent to give the Ministry of Northern Development and Mines information on the operations that are planned as well as the proponent's plans for the mitigation of potential residual safety hazards or the reclamation of damage to the environment.
- Require any proponent wishing to develop a mine, to give notice to the Ministry of Northern Development and Mines.
- Where a new mine is to be developed, require the proponent to file with the Ministry of Northern Development and Mines an outline of the development and a closure plan with the estimated cost.
- Require public notification of any planned new mine.

3. MINING PERMIT:

- Provide that no mine can begin production until it has received a permit to mine from the Minister of Mines.
- Require that the mining permit not be issued until all other required approvals have been granted and a closure plan has been approved.
- Provide for a specific approval process for bulk sampling.

4. CLOSURE:

- Once a closure plan has been accepted by the Government, require a financial assurance to be deposited (based on the cost estimate of the closure plan), to be held until reclamation is complete.

5. CONFIDENTIALITY:

- Require all government agencies in receipt of confidential corporate information to provide access to that information only to authorized personnel.

6. EXISTING MINES:

- Require existing mining operations to conform with the requirements for closure plans and financial assurances within a specified period.

INDUSTRIAL MINERALS

- Include in the **Mining Act** all conventional industrial mineral surface-mining operations on private and Crown lands, with the exception of structural industrial minerals including aggregates such as sand, gravel, crushed or broken stone, cement, lime, structural clay products and similar commodities (which would continue to be administered under the **Aggregate Resources Act).**
- Include in the **Mining Act,** for the surface-mining operations of industrial minerals, requirements for quarry permits, operating and rehabilitation plans, financial assurances and transfers of permits.

DOMESTIC PROCESSING

- Retain the current provisions in Section 104 of the **Mining Act** in order to encourage the domestic processing of the minerals produced in the Province, to monitor the processing activity, and to encourage employment in resource industries.

USE OF REGULATIONS

- Incorporate administrative details such as the structure of fees, approved staking methods and assessment work credits in Regulations.
- Appoint a Minister's Advisory Committee on **Mining Act** regulations.
- Require advance notice of Regulations to allow an opportunity for comment by interested members of the public.

FREEDOM OF INFORMATION VS. CONFIDENTIALITY

- Define the type of information about corporate or individual owners of mining claims to be collected, disclosed to the public, and kept confidential.
- Define the information resulting from work done on mining claims to be collected and the conditions under which it may be disclosed to the public.

APPENDIX B

A BRIEF HISTORY OF MINING AND MINERAL LEGISLATION IN ONTARIO

The earliest commercially successful mines in Ontario were developed on privately held land grants in the southern part of the province: north of Lake Erie near Lynhurst (iron ore, 1800), Normandale (iron ore, 1813) and Paris (gypsum, 1822), and north of Lake Ontario near Marmora (iron ore, 1820).

Following the **Union Act** of 1840, the United Provinces were without a formal mining code to guide or control the development of mineral resources. With the building of the railway through the pre-Cambrian shield, parts of Northern Ontario were opened up and minerals discovered. By 1845, news of mineral discoveries on unalienated Crown lands prompted the Government to introduce regulations governing the search for valuable minerals while encouraging development.

Through Orders-in-Council, the government set an exploration fee of $100 (which was in effect until 1861) and issued licences to occupy a mining claim in perpetuity. Initially the licence covered five square miles, then 10 square miles and then five-eights of a square mile. Other new regulations allowed:

- a licence of occupation to be valid for two years after which the licensee had to purchase the mining location for $1.50 an acre or forfeit all rights in the property;
- a patent to be awarded on proof of one year's work and payment of $1.00 per acre.

Gold and silver were reserved in licences and then the reservations were abolished; royalties on base metal ores were set, then reduced and finally eliminated.

During this period, some of the province's major discoveries occurred. For example, in 1846, the Bruce copper deposit was discovered, and silver was reported in the vicinity of Thunder Bay.

Ontario -- like the rest of Canada -- was facing the challenge of developing a mineral industry in a new, sparsely-populated country. Discoveries depended on the tenacity of individual prospectors who usually had little capital to invest. As long as both people and capital were scarce, only the discovery of a mineral deposit that could be turned into a valuable commodity with a limited amount of labour and investment attracted attention. Once a strike was reported, the apparent magnitude of the return would attract large numbers of people. Such prospecting rushes would lead to administrative problems: disputes over land titles, claims staked and work done, etc. In addition, rushes had an impact on social development. If deposits extended to depth, and if capital was available, a conventional mining camp would develop and, around the mining camp, a community to service the mine. However, if the mineral resource base was too small, it would not be able to support a community and even the mining camp would eventually become a ghost town.

The **Gold Mining Act** (1864-1867) was the first attempt to entrench in the mining code the rights of prospectors and miners in the United Provinces. The Act was passed to regulate exploration and mining during the 1864 gold rush to the St. Francis and Chaudiere Rivers in Lower Canada and was in force when gold was discovered near Madoc at what was to become the Richardson Mine in 1866.

After Confederation, the **Gold Mining Act** was succeeded by the **Gold and Silver Mining Act** (1868) which allowed private lands to be mined by their owners for gold and silver and public lands to be explored and mined by licensees, subject to a royalty being paid. The licence fee to prospect and mine Crown lands was $1. 05 per year. During this period, salt, gold and silver mines were developed.

In 1869, the **Gold and Silver Mining Act** was repealed and replaced by the **General Mining Act** which was an attempt to deal with ores and minerals of all kinds. The 1869 Act rescinded all royalties, taxes, duties and reservations and provided that no reservation should be inserted in any mining patent sold or granted under that Act. The **General Mining Act** served, with minor amendments, until 1892. During this period, the nickel ores of Sudbury were discovered in 1883. Other discoveries included gold, zinc, and mica.

The first precious metal "booms" in Ontario were near Eldorado in Hastings County in 1866, in the Lake of the Woods area in the late 1870s and early

1890s and the Silver Islet discovery in Lake Superior in 1868. These discoveries did not lead to the development of viable communities, however, and the future of mining communities in other areas was far from certain. The major precious metal camps in Ontario developed only after the Sullivan Camp in British Columbia was well established and after the Klondike rush had passed its peak in 1900. Key discovery dates were 1903 (silver, cobalt at Long Lake/Cobalt), 1906 (gold at Larder Lake), 1908 (gold in the Porcupine area), 1911 (gold at Kirkland Lake), and 1925 (gold near Red Lake).

As the industry continued to develop, so did the government's efforts at legislation and administration. The **Mines Act** (1892-1900) offered prospectors a choice between the grant of a mining location in fee simple and 10-year, renewable lease which might be converted to a patent. It also set out work requirements for the first seven years on both leases and patents. Prospectors who failed to meet the requirements could lose the lease or the right to mine. A mine profit tax was instituted at a maximum rate of 3 per cent on the deemed value of ores and minerals at the pit's mouth, after deduction of the actual cost of mining. The tax was payable seven to 15 years after obtaining a patent. The Act also reserved the pine trees, except those used in mining, in all title documents.

The government revised the **Mining Act** again in 1900. In an effort to encourage more mining activity, the **Mining Act** (1900-1905) abolished all royalties and rescinded all prior restrictions on mining lands. However, to protect the forest industry, the Act gave the government the ability to withdraw surface rights to protect harvestable timber. Outside mining divisions, a person without a miner's licence could apply for a mining location on discovery and immediately obtain a patent or convertible lease - subject to a seven-year work requirement. In addition, a licensee was required to stake and work a claim for two years before obtaining a patent or lease, and the Commissioner of Lands was given the authority to sell lands known to be rich in minerals by public auction. Within mining divisions, a licensee was required to stake, record and work a claim for three to four years before applying for a lease or patent.

Then came the Cobalt silver rush (1903-1905). From that experience, the government determined that the **Mining Act** dealt inadequately with the rights of miners and with mine hazards and that the frequent changes to regulations compounded the problems inherent in any staking rush. As a result, the Government of Ontario sponsored a mining convention and sought recommendations from prospectors and miners. The resulting legislation, the **Mines Act** of 1906, provided a simple means to secure interests in mining claims, certainty and security of title after complying with working requirements and the simple and speedy settlement of title disputes. That Act forms the basis for Ontario's present-day mining legislation.

With the **Mines Act** of 1906, Ontario established a mining environment that differentiated it from many other jurisdictions and that contributed to substantial foreign investment in mining ventures in the province. The Act, which abolished royalties, established: the authority to appoint recorders, a miner's licence (now a prospector's licence), working permits which gave prospectors exclusive rights to work a specific claim-sized area, and claim sizes, staking and recording procedures and work requirements (240 days over a four-year period to avoid forfeiture). The Act also authorized the appointment of a Mining Commissioner to decide disputes and established the authority both to withdraw and reopen lands for prospecting and to establish provincial mines.

During the 1930s and 1940s, three actions had a profound effect on Ontario mines:

1. In 1934, the United States increased the guaranteed gold price from $20 to $35 an ounce. This change gave gold mining in Ontario and Canada a tremendous boost.
2. In 1936, the Canadian government amended the **Federal Income Tax Act**, exempting new producing metal mines from taxes for three years -- a powerful incentive to development. This incentive was replaced by other provisions under the income tax reform of the late 1960s.
3. In 1948, the Canadian government introduced the **Emergency Gold Mining Assistance Act** (EGMA), which was essentially a cost-plus formula that allowed Canadian producers to sell their gold production to the federal government. The Act was particularly beneficial after World War II, when the fixed U.S. gold price changed from a floor to a ceiling price. The Act remained operative until 1972 when rising gold prices made it redundant.

Since the 1930s, Ontario has had several major mineral discoveries: iron ore in Steep Rock Lake (1944), lead zinc deposits at Manitouwadge (1953), large scale uranium production at Elliot Lake (1956) and zinc-silver in Timmins (the Kidd Creek Mine) - the most significant base metal discovery in Ontario since Sudbury.

With the 1980s, the exploration industry in Ontario has experienced new growth and interest. The extraordinarily high gold prices of 1980 and measures such as the Ontario Mineral Exploration Program (OMEP) and the federal tax provision for flow-through shares, sparked a new

period of feverish gold exploration which resulted in the discovery of the three Hemlo gold mines, the reopening of older mines and the opening of other new ones. Gold production in Ontario, which had reached a low point in 1981, had nearly tripled by 1987. However, that is still less than a third of the level of gold production achieved in 1940.

The following figures show some of the trends that have occurred in Ontario's mining industry since 1900. The first, "Ontario Metal Mining: Employment and Production," shows the average annual direct employment (in man-years of work) and annual physical output (in short tons of ore mined). From the beginning of the century up to 1960, both employment and production follow a parallel, upward pattern with declines occurring during the 1920 recession, the 1929-32 depression and World War II. Declines during the recession and depression were followed by spectacular periods of growth, while the industry recovered in the late 1940s and early 1950s from the wartime slump. Over that period, while tonnage growth accelerated, employment growth decelerated, particularly from 1946 to 1960. However, from the early 1970s on, physical output began to decline in parallel with employment levels.

The second figure, "Ontario Metal Mining: Value of Production and Value of Ore," shows (in constant 1961 dollars) the trend in real aggregate value of production in metal mining (in millions of dollars) against the trend in real value of metallic ores (in dollars per short ton). Average values of Ontario ores, which had increased from 1900 to 1911 from $20 to $70, decreased dramatically to the end of World War II -- a decrease only broken during the 1930s due to the U.S. increase in the floor price for gold. Since the mid-1940s, the average real value of ore has remained fairly steady ($10 to $15 per short ton) with an upward blip due to relatively high mineral prices (particularly of gold which peaked in 1980) and a drop back to the $10 to $15 range. Only in the last year has there been a slight increase which may be attributed to the almost exclusive pre-occupation of the exploration sector with finding new gold mines.

The dramatic decline in average values of Ontario ores in the 1920s and 1930s was initially due to the exhaustion of the relatively small, high grade precious metal deposits which had triggered the mining boom in the first decade of the century. Later the decline was associated with the shift from precious to base metal mining. The decline in average value of ore is in stark contrast to the steady increase in total value of production from 1900 to the 1960s/70s. Until 1960 there were only two major declines in that value due to World War I and World War II and corresponding with similar decreases in annual average employment for both of these periods and, during World War II, with the decrease in the short tons of ore mined. The decrease in the real value of production during the early 1960s parallels the decrease over the same period in both annual average employment and short tons of ore mined. The overall trend from 1960 to date in real value of production is much flatter than during the preceding periods. Particularly noticeable is the great volatility of production values from the late 1970s to this date.

The overall divergence of declining average ore values and increasing real values of production through this century can, to a considerable extent, be accounted for by changes in technology which are reflected in average mine size. Average mine size increased from 1900 to 1980 by a factor of about 100. However from 1980 to 1987 there has been a decline of 21.5 per cent in average mine size. The increase from 1900 to 1980 generally reflected a shift from small-scale, precious metal mining (vein type deposits) to large-scale, base metal mining (massive or disseminated sulphide deposits). The decline since 1980 reflects the role played by new gold mines. The actual pattern of capacity increase decade by decade in annual short tons of average metal mine production is as follows:

1900 - 9,800	1950 - 328,500
1910 - 19,100	1960 - 613,000
1920 - 50,900	1970 - 863,900
1930 - 130,100	1980 - 985,700
1940 - 140,700	1987 - 700,734

The third figure, "Ontario Metal Mining: Labour Productivity", correlates the value of production per man-year (in constant 1961 Canadian dollars) and the volume of production per man-year in short tons. The two series show reasonably close rising trends with a break occurring in the early '60s. In general, the value of production per man-year leads volume of production per man-year when metal prices are high or when precious metal dominates base metal mining. Conversely, the value of production lags volume of production when metal prices are lower or when base metal dominates precious metal mining - at least for the period from 1900 to the early 1960s. However, from the mid-1960s on, it appears that volume rises faster and declines less rapidly than value of production. This is most likely a result of technological change, particularly the increasing application of bulk mining methods. The flattening of most trends since the late 1960s may correlate with the declining rate of increase in average mine size which, from the early 1900s to the 1960s had moved between 90 and 160 per cent per decade

(with the exception of an 11 per cent increase in the 1930s) to 41 per cent through the 1960s, 14 per cent through the 1970s and to -21. 5 per cent through the 1980s to date.

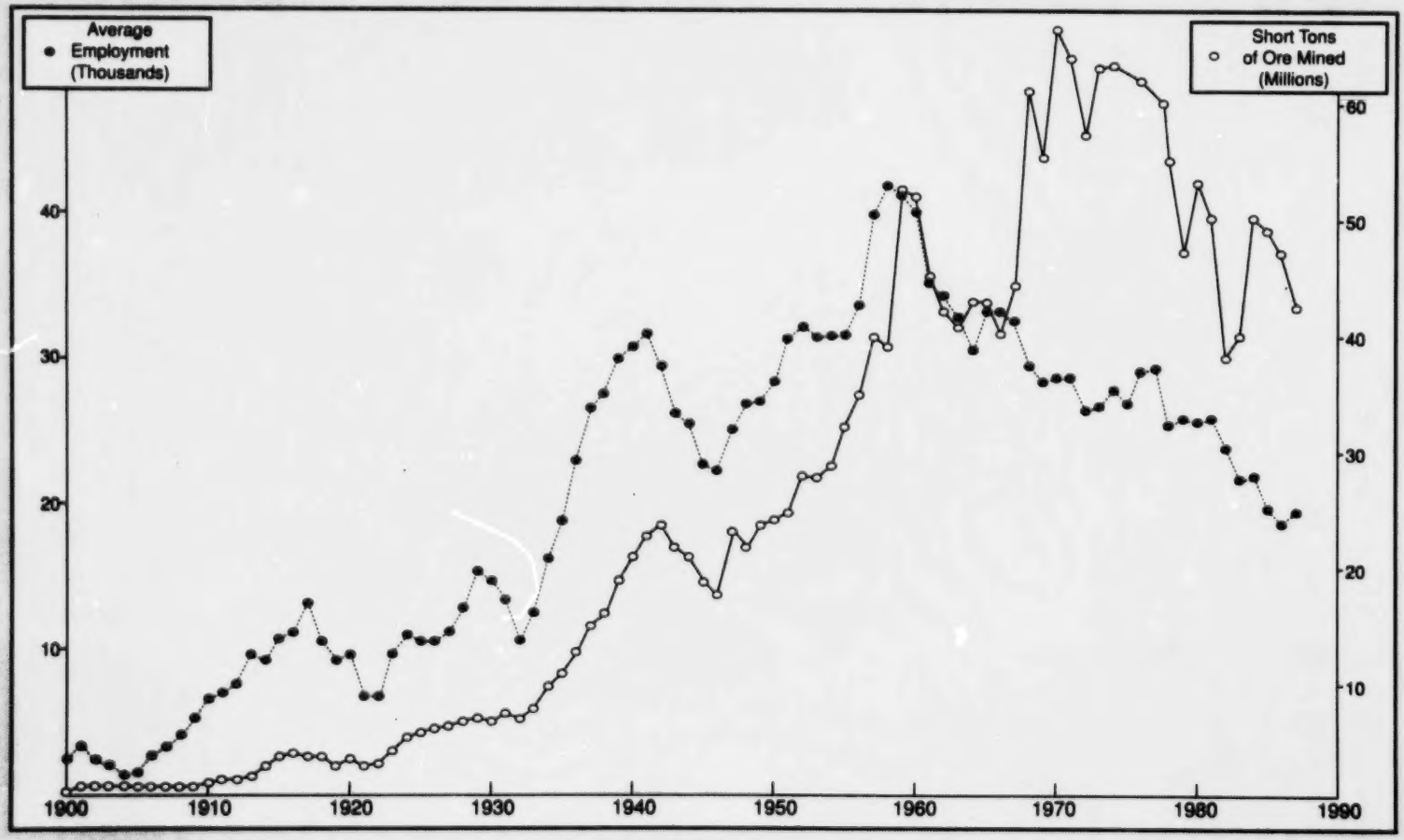
In summary, developments have occurred in a logical sequence. The initial change in product led to changes in the type of deposit primarily mined in the province. Different deposits required different modes of operation and technology in prospecting, development and production. These changes, together with changes in the nature of government/industry relations, led finally to changes in dominant modes of financing and in industry structure.

The product change that was the cause of all other changes was from precious metals to base metals. Put another way, the continuing decline in the value to volume ratio of ore mined was characterized by a continuing shift from higher to lower grade ores. There was, however, a slight reversal of this trend in the 1960s. This change may be considered a temporary phenomenon, likely to reverse in the 1980s.

Whereas, in the beginning, prospectors looked for outcrops, today deposits are found under thick overburden. Prospecting moved from labour intensive work to highly capital intensive geophysical and geochemical methods that often involve airborne surveys and cover large tracts of ground. This, in turn, requires control and staking of large areas. This is reflected in the changing pattern of annual mining claims recorded, shown in the fourth figure. Up to the early 1940s, "normal" staking activity fluctuated around 5,000 claims per year with "gold rush" peaks reaching 15,000 to 20,000. In the post World War II period, the normal activity was between 13,000 and 20,000, with base metal peaks reaching 45,000 to 55,000. The early 1980s saw gold fever drive the number of annual claims recorded above 65,000.

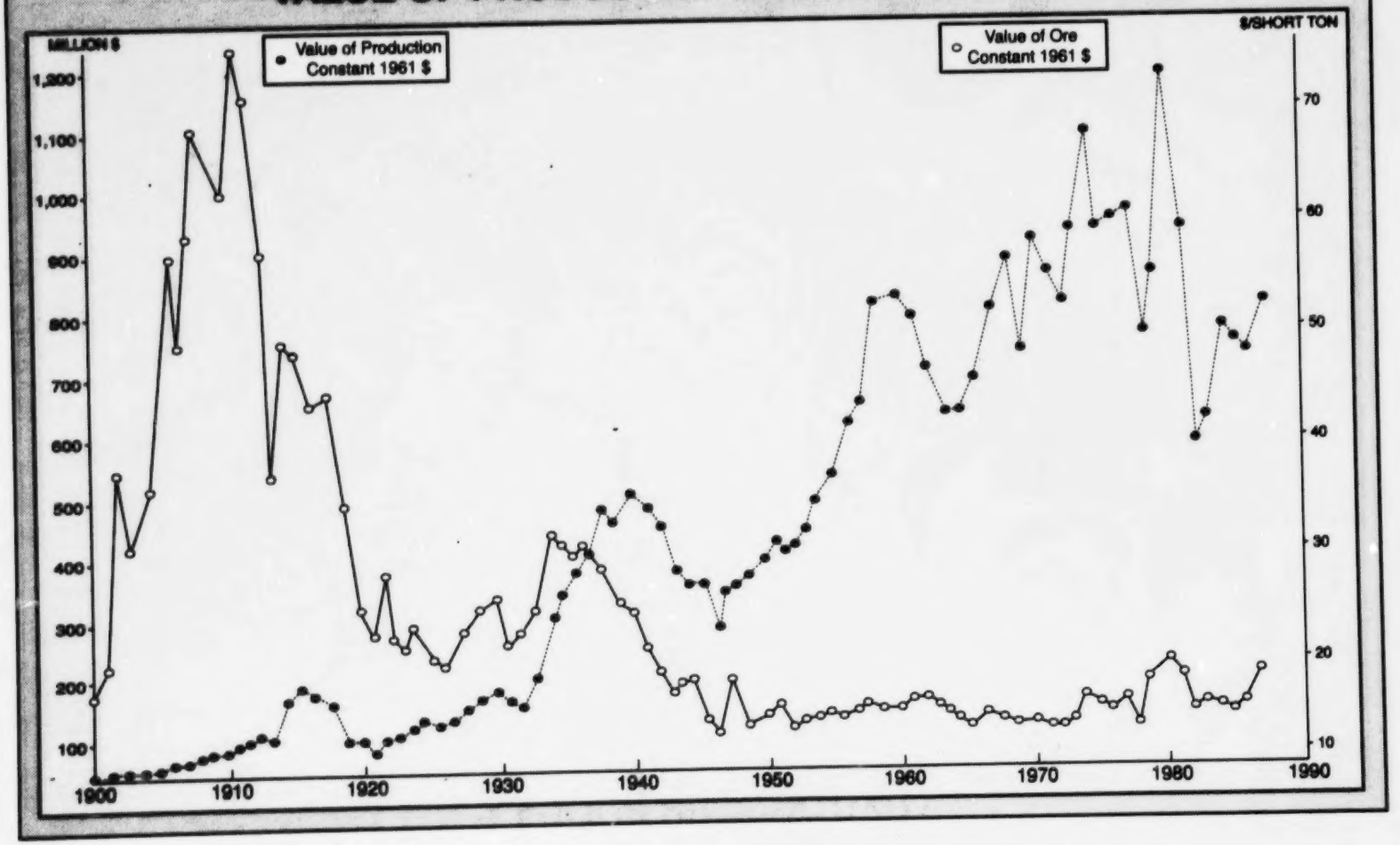
As the value to volume ratio decreased, the average size of mines increased. Even 30 to 40 years ago 300 to 1,500 tons per day were common mine sizes. Today, the norm is 3,000 tons per day and more. The individual miner working with jackleg, scraper or mucking machine and ore train was largely replaced by the drill jumbo and scoop tram operator. The value of the miner's equipment increased from several hundred or at most a few thousand dollars to many tens of thousands or even over a hundred thousand dollars. Open pit technology went underground. Mill size and complexity increased as well. These changes spell increasing capital requirements and longer lead times from discovery to production.

ONTARIO METAL MINING: EMPLOYMENT AND PRODUCTION



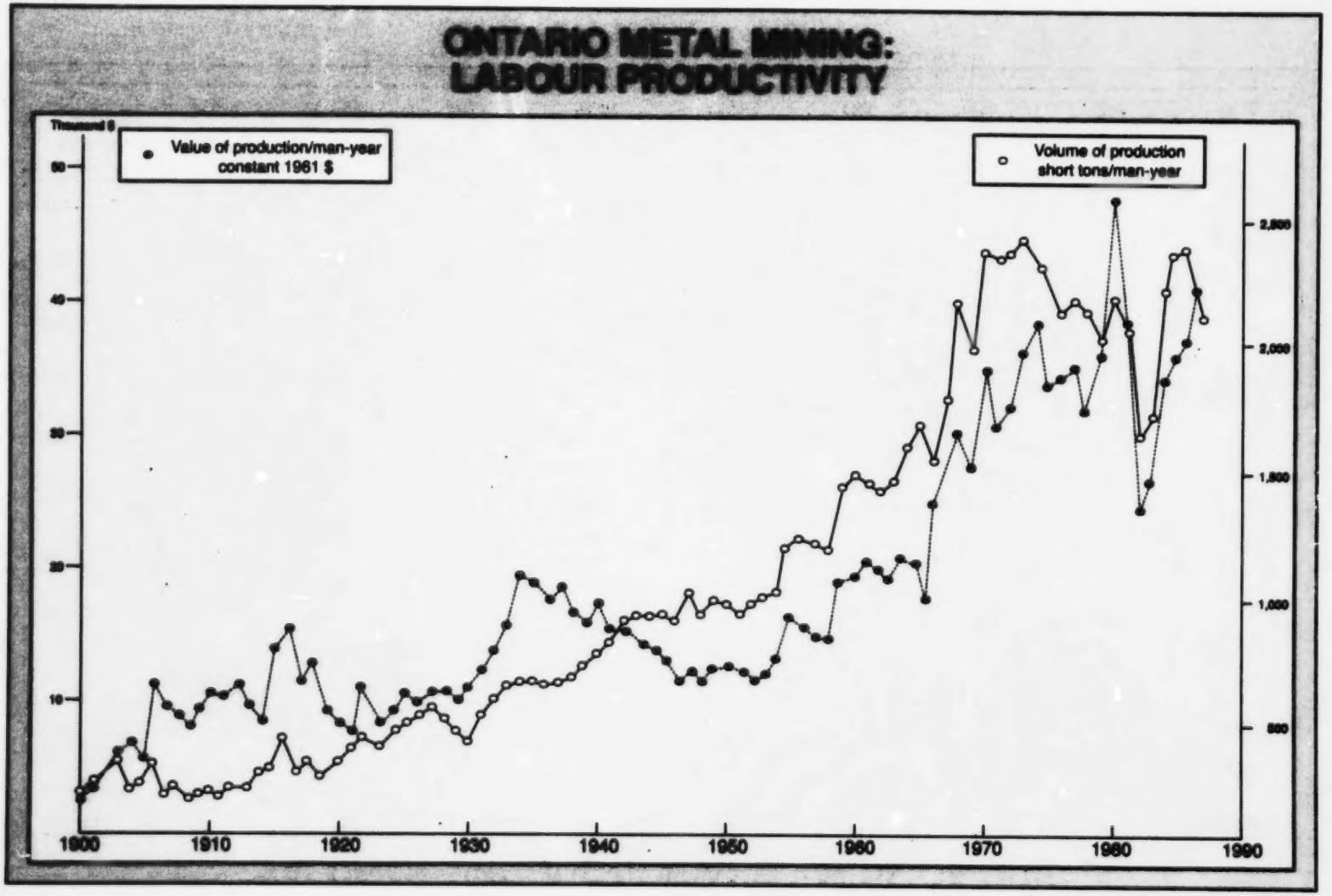
Source: Ontario Ministry of Northern Development and Mines 1988

ONTARIO METAL MINING:
VALUE OF PRODUCTION AND VALUE OF ORE



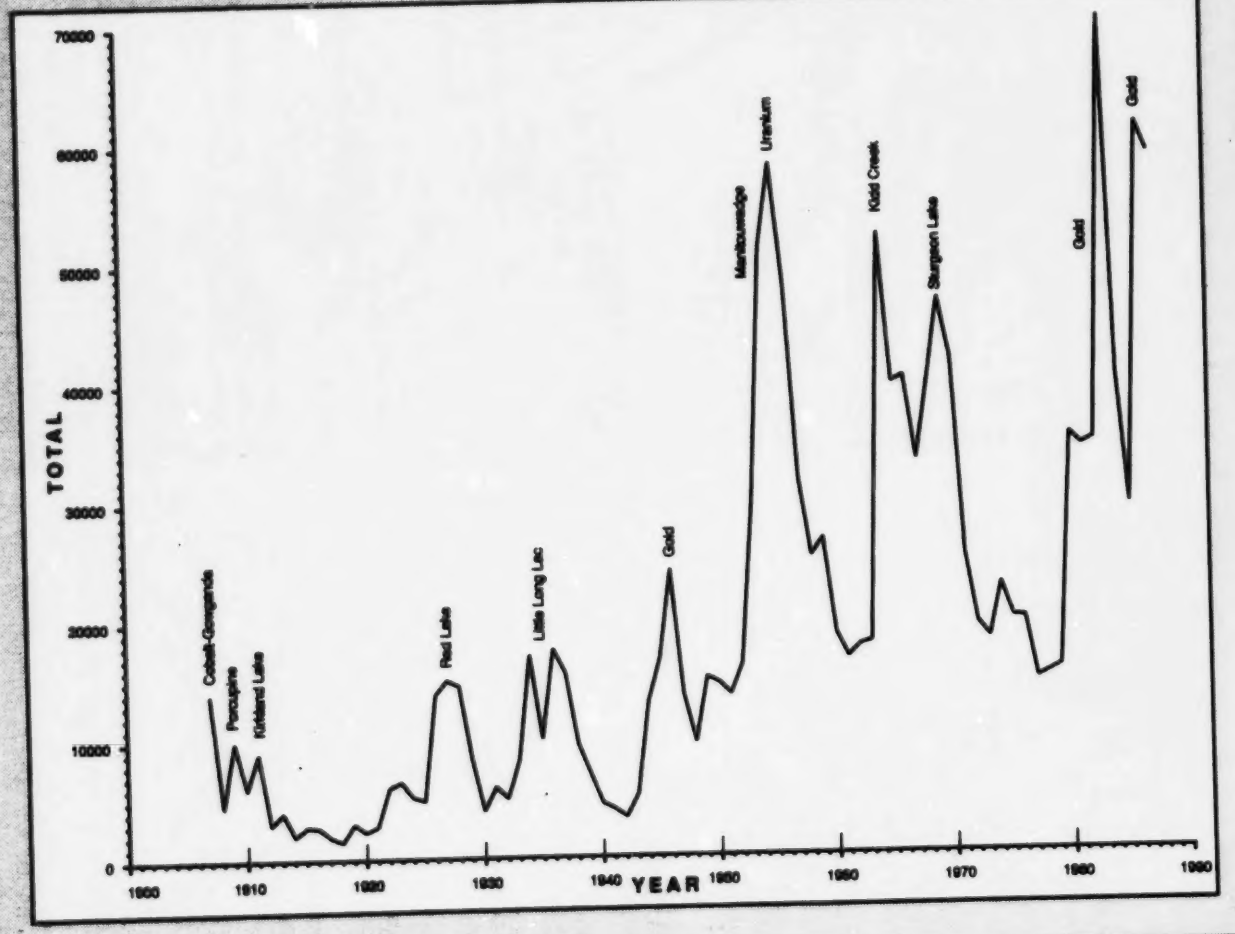
Source: Ontario Ministry of Northern Development and Mines 1988

ONTARIO METAL MINING: LABOUR PRODUCTIVITY



Source: Ontario Ministry of Northern Development and Mines 1988

MINING CLAIMS RECORDED IN ONTARIO (1907–1987)



Source: Ontario Ministry of Northern Development and Mines 1988

ONTARIO LEGISLATION

Assessment Act, Revised Statutes of Ontario, 1980, Chapter 31, March 1987, 72p.

Beach Protection Act, Revised Statutes of Ontario, 1980, Chapter 39, March 1982, 6p.

Environmental Assessment Act, Revised Statutes of Ontario, 1980, Chapter 140, February 1985, 24p.

Environmental Protection Act, Revised Statutes of Ontario, 1980, Chapter 141, December 1986, 142p.

Freedom of Information and Protection of Individual Property Act, Statutes of Ontario, 1987, Chapter 25, June 29, 1987, 42p.

Gas and Oil Leases Act, Revised Statutes of Ontario, 1980, Chapter 184.

Health Protection and Promotion Act, 1983, Revised Statutes of Ontario, 1980, Chapter 10, July 1987, 60p.

Industrial and Mining Lands Compensation Act, Revised Statutes of Ontario, 1980, Chapter 215.

Mining Act, Revised Statutes of Ontario, 1980, Chapter 268, May, 1983, 132p.

Mining Tax Act, Revised Statutes of Ontario, 1980, Chapter 11, (and Regulation 639), February 1987, 33p.

Occupational Health and Safety Act, Revised Statutes of Ontario, 1980, Chapter 321, and Regulations for Mines and Mining Plants.

Ontario Mineral Exploration Program Act, Revised Statutes of Ontario, 1980, Chapter 346, March 1982, 10p.

Ontario Water Resources Act, Revised Statutes of Ontario, 1980, Chapter 361, February 1987, 58p.

Petroleum Resources Act, Revised Statutes of Ontario, 1980, Chapter 377.

Pits and Quarries Control Act, Revised Statutes of Ontario, 1980, Chapter 378, (and Regulation 784) September 1984, 25p.

Planning Act, 1983, Statutes of Ontario, 1983, Chapter 1 as amended (and certain Regulations), December 1986, 108p.

Provincial Land Tax Act, Revised Statutes of Ontario, 1980, Chapter 399, as amended (and Regulations 813, 814 and 303/83), October 1983, 42p.

Public Lands Act, Revised Statutes of Ontario, 1980, Chapter 413, as amended by 1986, Chapter 64, 2.57, and Regulation 879, December 1986, 32p.

Securities Act, Revised Statutes of Ontario, 1980, Chapter 466, as amended (and Regulation 910), September 1987, 208p.

Workers' Compensation Act, Revised Statutes of Ontario, 1980, Chapter 539, as amended (and Regulations 950 and 951), June 1987, 128p.

FEDERAL LEGISLATION

Atomic Energy Control Act. Chap A-19, p. 153-161, 1970.

Canadian Environmental Protection Act, 35-36, 37, Elizabeth II, Chapter 22, 1988, 96p.

OTHER PROVINCIAL LEGISLATION *(Partial listing)*

Alberta:
Mines and Minerals Act, R.S.A. 1980, Chapter M-15.

Mines and Minerals Act, General Regulation, Alberta Regulation 163/84.

British Columbia:
Mineral Tenure Act (S.B.C. 1988 c.5) August 9, 1988, 29p.

Quebec:
Mining Act, (1987, Chapter 64), National Assembly of Québec, 91p.

ONTARIO: BOOKS, PUBLICATIONS, REPORTS

Anders, G. and T.P. Mohide: "The Future of Nickel and the Law of the Sea", Mineral Policy Background Paper No. 10, Government of Ontario, Toronto, Ontario, 1980.

Campbell, J.D. and K.B. Snell: "A Guide to Legislation Affecting Mining in Ontario", Mineral Policy Background Paper No. 18, Government of Ontario, Toronto, Ontario, 1984.

BIBLIOGRAPHY

Fahlgren, J.E.J. (Commissioner): "Final Report and Recommendations", The Royal Commission on the Northern Environment, 1985.

Fahlgren, J. E. J. (Commissioner): "The Onakawana Project - An Example of the Environmental Assessment Process in Ontario", The Royal Commission on the Northern Environment, 1983.

Freyman, A. J. : "The Role of Smaller Enterprises in the Canadian Mineral Industry with a Focus on Ontario", Occasional Paper No. 3. , Government of Ontario, Toronto, Ontario, 1978.

Gibson, T. W. : "The Mining Laws of Ontario and the Department of Mines", Toronto, King's Printer, 1933.

Ginn, R. M. (Chairman): "A Review of the Proposed New Mining Act of Ontario", Submission to Minister of Natural Resources of Ontario by the Prospectors and Developers Association, February 23, 1984, 22p.

Green, A. G. : "Ontario's Metal Mining Statistics", Mineral Policy Background Paper No. 16, Government of Ontario, Toronto, Ontario, 1983.

Green, A. G. and M. A. Green: "Productivity and Labour Costs in the Ontario Metal Mining Industry", Mineral Policy Background Paper No. 19, Government of Ontario, Toronto, Ontario, 1985.

Green, A. G. and M. A. Green: "Productivity and Labour Costs in the Ontario Metal Mining Industry 1975-1985: An Update", Mineral Policy Background, Paper No. 25, Government of Ontario, Toronto, Ontario, 1987.

Ham, James: "Report of the Royal Commission on the Health and Safety of Workers in Mines" Toronto, 1976.

Halloway, George T. (Chairman): "Report of the Ontario Nickel Commission", Printed by order of the Legislative Assembly of Ontario, Toronto, 1917, 584p.

Kalymon, B. A. et al: "Financing of the Junior Mining Company in Ontario", Occasional Paper No. 4, Government of Ontario, Toronto, Ontario, 1978.

Lajzerowicz J. and R. M. Woodbridge: "Environmental Protection and Mineral Management Dilemmas in the Sudbury Area" Energy, Mines and Resources Ottawa, 1977, 38p.

Leith, J. C. : "Exploration of Ontario Mineral Resources: An Economic Policy Analysis", Toronto, Ontario Economic Council, 1976.

Mohide, T. P. : "The Platinum Group Metals - Ontario and the World", Mineral Policy Background Paper No. 7, Government of Ontario, Toronto, Ontario, 1979.

Mohide, T. P. , C. L. Warden and J. D. Mason: "Towards a Nickel Policy for the Province of Ontario", Mineral Policy Background Paper No. 4, Government of Ontario, Toronto, Ontario, 1976.

"Ontario Mining Statistics - A Preliminary Compendium", Part II presents a chronicle of legislation affecting mining in Ontario from 1946 through 1977. Mineral Policy Background Paper No. 11, Government of Ontario, Toronto, Ontario, 1980.

Postle, R. : "Review of Platinum Group Element Deposits in Ontario", Mineral Policy Background Paper No. 24, Government of Ontario, Toronto, Ontario, 1986.

Rachamalla, K. S. and D. H. Bell: "Towards a Zinc Policy for the Province of Ontario", Mineral Policy Background Paper No. 3, Government of Ontario, Toronto, Ontario, 1976.

Rhodes, John R. (Chairman): "Report of the Advisory Committee to the Minister of Natural Resources on the Revision of the Mining Act. " Toronto, 1973, 40p.

Runnalls, O. J. C. : "Ontario's Uranium Mining Industry - Past, Present and Future", Toronto, Ministry of Northern Development and Mines, Mineral Policy Background Paper No. 13, 1981.

Spender, J. O. (Chairman): "Report of the Mineral Resources Committee to the Minister of Mines", Toronto, 1969, 43p. (and Supplement 18p.)

Thompson, E. G. (Chairman): "Final Report and Recommendations of the Advisory Committee on Junior Resource Financing and the Competitive Position of Ontario" Toronto, 1986 Vol. I, 179p., Vol II, 125p.

OTHER: BOOKS, PUBLICATIONS, REPORTS

Aitken, W. R. O. : "The Environment and the Economy" Centre for Resource Studies Special Paper, Kingston, June 1988, 7p.

Allen, J. R. : "Developing an Effective Corporate Environmental Compliance Policy" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 4p.

Anders G. , W. P. Gramm and S. C. Maurice: "Does Resource Conservation Pay?", Los Angeles, International Institute for Economic Research, 1978.

Anders G. , W. P. Gramm and S. C. Maurice: "The Impact of Taxation and Environmental Controls: A Pilot Study", Mineral Policy Background Paper No. 1, Government of Ontario, Toronto, Ontario, 1975.

Anders G. et al: "The Economics of Mineral Extraction", New York, Praeger Publishers, 1980.

Bartlett, R. H. , ed. : "Mining Law in Canada", Saskatoon, Law Society of Saskatchewan, 1984.

Biviano, Marilyn B. and Gillette, Richard S. : "Implications of Mine Waste Regulation", in "Mineral Issues 1987" Bureau of Mines, U. S. Dept of the Interior, 11p.

Carman, J. S. : "Obstacles to Mineral Development: A Pragmatic View", New York, Pergamon Press, 1979.

Christensen, J. D. : "The OSMRE Perspective on 10 years of the Surface Mining Act" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 6p.

Cranstone, Donald A. : "The Canadian Mineral Discovery Experience 1946 - 1983" Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa, 1984, 53p.

Crook, Raymond L. : "Mine Development Review Process" Seminar Presentation, Ministry of Energy, Mines and Petroleum Resources, Victoria, B. C. , February 24, 1988.

Department of Mines: "Report of the Mineral Revenues Inquiry in Regard to the study into Mineral (including Petroleum) Revenues in Western Australia", Western Australia, 1987.

Down, C. P. and Stocks, J. : "Environmental Impact of Mining" John Wiley & Sons, New York, 1977, 371p.

Drolet, Jean-Paul: "Mining Legislation and the Role of Responsible Authorities", Ottawa, Dept. of Energy, Mines and Resources, 1975.

Federal/Provincial/Industry Sub-Committee on Mine Waste: Intergovernmental Working Group on the Mineral Industry "Report on the Economic Policy Aspects of Acid Discharge", August 29, 1988, 64p.

Hamilton S. A. : "Land Use for Mineral Based Activities", Ottawa, Dept. of Energy, Mines and Resources, 1980.

Jones, M. J. , ed. : "Minerals and The Environment" The Institution of Mining and Metallurgy, London, 1975 (compilation of 41 papers).

Lecuyer, Gerard (Chairman): "Report of the National Task Force on Environment and Economy", Canadian Council of Resource and Environment Ministers, 1987, 18p.

Maurice S. C. and P. J. Mizzi: "An Analysis of Market Structure: The Nickel Industry", Mineral Policy Background Paper No. 21, Government of Ontario, Toronto, Ontario, 1985.

Maxfield, P. C. : "The Income Taxation of Mining Operations", Boulder, Colorado, Rocky Mountain Mineral Law Foundation, 1973.

Merritt, G. L. and Giovannitti, E. F. : "The Implementation of the Federal Surface Mining Control and Reclamation Act of 1977; A State Perspective" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 6p.

Miner, R. B. , ed. : "Mining Law - from Staking to Production", Toronto, The Law Society of Upper Canada, 1985.

Ministry of Energy: "Review of Mining Legislation - a Discussion Paper", Wellington, New Zealand, 1986, 30p.

Ministry of Energy, Mines and Petroleum Resources: "Mine Development Review Process, An Introduction" Victoria, B. C. 1987, 14p.

Mohide, T. P. : "Gold", Mineral Policy Background Paper No. 12, Government of Ontario, Toronto, Ontario, 1981.

Mohide, T. P. : "Silver", Mineral Policy Background Paper No. 20, Government of Ontario, Toronto, Ontario, 1985.

Nelson, R. E. : "Permitting a High Profile Mine" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 3p.

Olsen D. and Lama R. D. : "Environmental Aspects of Mining in Australia with Special Emphasis on New South Wales South Coast Underground Coal Mines" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 12p.

Pascoe, D. Monte and Fisher, Gary K. : "Colorado's Joint Review Process for Major Energy and Mineral Resource Development Projects", Colorado Department of Natural Resources, 1980, 84p. and appendices.

Slagel, G. E. : "Land Management and Environmental Quality: A Decade of Experience with SMCRA The Experience of the Eastern Coal Industry" Society of Mining Engineers Annual Meeting, Phoenix, Arizona, January 1988, 3p.

Wright, R. J. , ed. : "Canadian Mining Law", Toronto, Butterworth 1975.

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